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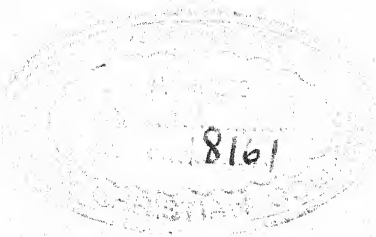
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# A COMMERCIAL GEOGRAPHY

BY  
L. DUDLEY STAMP, B.A., D.Sc.

SIR ERNEST CASSEL READER IN ECONOMIC GEOGRAPHY IN THE  
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LAND UTILISATION SURVEY OF BRITAIN

*WITH MAPS AND DIAGRAMS*



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## PREFACE

Dedications of works other than *Belles Lettres* or *Magna Opera*, into neither of which categories does the present book fall, are out of fashion. If they were not, I might reasonably dedicate this book to the twenty-five thousand bankers—and others—the study of whose efforts when facing their professional bunkers has inspired or driven me to this attempt to put before their successors what I believe to be some of the essentials of the subject. The subject is Commercial Geography—a very good dog whose father or grandfather had a bad name and whose sins are still being visited on the children.

The real subject-matter of geography is the common knowledge which we all acquire, at least in fragments, in the course of life. The purpose of its study is to give us the necessary equipment to sort out and arrange that knowledge and so to interpret, as intelligent citizens we must every day of our lives, the information brought to us by our daily papers.

More than ever to-day the world has become a unit and we are all forced to become geographically minded. Who would have believed a few years ago that the affairs of Abyssinia would have robbed the Englishman's table of his Gorgonzola, or that a bowl of fruit in its place might represent the combined efforts of five continents?

In the course of six years' lecturing to the local branches of the Institute of Bankers and to other professional associations up and down the country, I have found the real reason why

geography must be a key subject is the interdependence of all parts of the modern world, and I have also found that the most human of all the humanities *does* get overlooked. I do not think—it is perhaps a large claim—that I have ever had an audience uninterested in the revelation, and I can only hope that in this little work I have succeeded in putting the new point of view before a larger audience.

In the preparation of the maps and diagrams for this book I have been ably assisted by Mr. R. L. Tucker, B.Sc., Miss L. M. Neate and Miss E. Bicknell.

L. D. S.

LONDON SCHOOL OF ECONOMICS,  
*July, 1936.*

## NOTE TO THE THIRD EDITION

The momentous events of the year 1938 have necessitated a number of alterations both to maps and text.

I am greatly indebted to Mr. J. A. Todd of the Liverpool Cotton Service who has very kindly revised the section on cotton and given me the benefit of his expert knowledge.

L. D. S.

*November, 1938.*

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## CHAPTER I

### The Modern Viewpoint

Few subjects have changed more fundamentally within the last twenty-five years than has Geography ; both with regard to its viewpoint and its method. The old Geography is not, unfortunately, dead yet and not a few of those who read these lines will have recollections, more or less unpleasant, of their early school lessons. Perhaps they can remember reciting the creed which began :—Northumberland, Newcastle-on-the-Tyne, Durham, Durham-on-the-Wear, Yorkshire, York-on-the-Ouse, Cumberland, Carlisle-on-the-Eden, Westmorland, Appleby-on-the-Eden, etc. Or it may have been lists of capes and bays or of towns and what they were “noted for,” countries and their products. Many of the facts learnt in this old-fashioned way were both useful and important ; others certainly were not. In any case what is now regarded as the fundamental principle of Geography scarcely entered into consideration at all. The fact that a particular country is “noted” for certain products is the natural result of a variety of causes, some geographical, some economic.

It is a fundamental principle of the new Geography to look for causes and as far as possible to trace their influence in the world of to-day, in other words the new Geography works from cause to effect, and is thus sometimes described as “Causal Geography.” Causal is not exactly a good word : it is so often apt to be misread or confused with “casual,” and let us hope that in any case the new Geography is not casual. The influence which the geographical factors have upon the life of man has sometimes been referred to as “Geographical Control.” This phrase is misleading in that it suggests more than is actually the case ; let us say rather, “Geographical Influence.” Although we, as human beings, are influenced by the geographical factors of our environment, we are not controlled by them ; much of

human activity is actually directed towards overcoming the disadvantages of the geographical factors.

Much of the old Geography was far removed from the affairs of everyday life. It seems difficult, for example, to find any reason why a list of the capes and bays of the continent of Asia could furnish information which would be of real value or interest in the everyday life of a citizen. Modern Geography seeks, on the other hand, to maintain an essentially close contact with everyday life; indeed, the subject-matter of Geography may be described as common knowledge, in that it is the type of information which the citizen ordinarily accumulates from day to day from the reading of his newspaper or from the discussion of current events with his fellow beings. One of our greatest living industrialists recently said that the mind of the ordinary man was rather like a rag-bag: many of the rags are fragments of geographical knowledge, and though they may be loosely strung together, patchwork quilts are out of fashion. It is the function of geography to classify and standardise common knowledge concerning the countries of the world and concerning the relationships between the life of man and his environment. In 1914 to 1919, for the first time in its history, the whole world was involved in a colossal struggle, and to-day the world is more than ever a unit, in that the prosperity of one area influences immediately the prosperity of the whole; a new fashion, a new demand in South America may vivify the factories of Lancashire just as much as the current standard of living amongst the Japanese may throw those same factories completely out of action. Whether we will it or no we are every one of us intimately connected and largely influenced by the geographical conditions and their effect on trade and commerce in all parts of the world. The world has become, of necessity, geographically minded.

In course of time we may accumulate quite a fund of information about any particular foreign country, but for the most part it will be disconnected information; an absence of clear thought and of arrangement is too often apparent in the answers to examination papers, even those of adults. If a man is asked for a concise geographical description of Switzerland, it is quite likely the answer will start something in this manner. "Switzerland is a very mountainous country and has much snow so the

people go there for winter sports in the ski-ing season and there are famous toboggan rides such as the Cresta Run ; a lot of the Swiss entertain these visitors and so they are called a nation of shopkeepers. Switzerland is in Europe and also makes watches. The League of Nations has its headquarters at Geneva which is on one of the beautiful lakes for which Switzerland is noted."

There is quite a lot of information in this answer, but it jumps from one thing to another, it has no consecutive arrangement, and misses the essential reasons for the activities of the country. Thus it is of fundamental importance at the outset to realise that the study of Geography must result in a systematic treatment which, in turn, will lead naturally to an appreciation of the real value of the various geographical and other factors which influence the life of the country and will enable the student to judge for himself the pros and cons of many of the current problems of the day.

Unfortunately it is still apparent that many students of commercial Geography regard it as a subject which "has to be mugged up for the examination" and can then be completely forgotten. Not infrequently such a student will make statements in his examination answer book which if made to one of his fellow workers would certainly result in his being certified for a mental home. Thus a bank clerk, when asked to give some account of the production of gold in the world, started away by saying that gold is found, particularly in South Africa, mainly in the form of diamonds. It may be safely said that if a statement is not common sense it is not likely to be true geographically ; above all, commercial Geography is a common-sense, organised treatment of the facts of common knowledge relating to the world, its countries and peoples and their activities.



## CHAPTER II

### The Geographical Factors

The old Geography was frequently defined as "a description of the world and its people." We have seen that this purely descriptive point of view has been replaced by one which seeks to find and understand the underlying causes. We may say then that Geography is, in essence, the study of the earth as the home of man, of the influence which the natural environment exercises on man and his activities, together with the analysis of those efforts of man to make the most use of the advantages of that environment or to overcome the disadvantages. Thus the first business of Geography is to discuss the natural or physical environment. We all know what we mean by our environment, but perhaps we find it a little difficult to define. That is because the environment affects us as a whole; we are scarcely conscious of the different factors which go to make up our environment. The geographer must take notice of both points of view: he must realise that the environment is a living and a concrete whole and acts as such, but he must also realise that it can be analysed and the factors isolated. What are the geographical factors which go towards the making up of our natural environment?

**1. Location or Position.**—The factor of location or position is one which exercises a continuous influence on the life of every individual as well as on the life of the world as a whole. Our home is in one particular spot, our work, whether it be school, office or workshop, is in another. The distance between the two, the necessity for catching a train or a bus, will probably determine the exact moment at which we get out of bed and the speed at which we eat our breakfast and whether we come home to lunch or not. In every case our daily life is thus influenced by the factor of position or location. To some extent

we are free agents to alter or to counteract that influence by moving our home, but the location of our new home will in turn influence life in the same way.

Now let us consider from the same point of view the location of a town. London is in a certain position; that is a fixed fact. Edinburgh is in another position 400 miles away. If we wish to get from one to the other we must of necessity decide between the different methods of transport which are available. The modern world is doing its utmost to overcome the disadvantages of position and providing us with ever faster and faster means of transit from one area to another. If in a great hurry we might use an aeroplane to get from London to Edinburgh, if the matter is less pressing we shall probably make a night journey by express train; if there is less urgent need or if on holiday bent a trip by road might be more interesting. For some purposes we can annihilate distance entirely by picking up the telephone receiver, another invention of man directed towards overcoming the disadvantages of position. Taking the world as a whole, for all practical purposes the countries have fixed positions. Britain will always be separated from the Continent by the English Channel and the Straits of Dover; according to circumstances this may be an immense advantage or a great disadvantage. It frees us from many frontier difficulties, but it turns our thoughts towards the desirability of constructing a Channel tunnel. Or again, take the position of New Zealand, on the other side of the world. Although many of us have near relatives in New Zealand we cannot pay them a week-end visit; the factor of location makes a family reunion impossible, and unless it is a matter of great urgency or unless we are unduly wealthy it is scarcely likely that we shall use the telephone. But this same factor of location affects the whole economic life and commercial development of New Zealand. Much of the trade is with the Mother Country, but the factor of distance means that New Zealand must specialise on commodities which can stand the long voyage and which will pay the cost of the journey of 13,000 miles which is involved. Until very recently we could receive frozen meat from Australia and New Zealand, but we could *not* receive the chilled beef which forms our principal meat import from the Argentine, but which could not be kept in a chilled condition for the period of the longer

voyage from the more distant countries. Finally there is the position of a country or of a town relative to the world as a whole, *i.e.* to the equator and the poles, for position must of necessity be a main factor in determining climatic conditions. It is interesting that position and location form a factor of the environment which we cannot alter although we may direct much thought and attention to overcoming the disadvantages resulting from it.

**2. Physical Features.**—The second of the geographical factors is one which at first sight seems to influence the life of the individual rather less than the life of a country as a whole. We all know, for example, that Switzerland is a very mountainous country, that towns and villages cannot be built on the mountains, but must of necessity be restricted to the valleys or areas of comparatively flat land. Nothing which man can do can alter this state of affairs and the life of the country is determined accordingly. On the other hand, we all know that Holland is on the whole a very flat country, that the whole can be, and indeed is, utilised and that human settlements are scattered over practically all its surface. Coming nearer home, we know that there is a contrast between the hilly and mountainous country of Wales and the fertile, open stretches of farmland of Eastern England. Even nearer at hand we can think of railway cuttings or tunnels which show how man's activities have been affected by physical conditions; and indeed, for ourselves, when we go out for a walk and climb a hill to get a viewpoint, or we find our path blocked by the presence of a stream across which there is no foot-bridge, our lives are being influenced by physical features. Thus in considering the Geography of a region it is important to take the physical features as the second factor for consideration.

**3. Geological Structure.**—In a Commercial Geography it may seem strange at first sight to introduce the word "Geology," and one may say, what has geological structure to do with commercial Geography? Actually the physical features of a country are merely the outward and visible result of the underlying geological structure. Where the rocks are hard or resistant to weathering, hills and mountains result; where they are soft or easily worn away we shall probably find valleys and lowlands.

The relief is a correlation between the two factors. But the influence of structure and geology on the commercial activities of nations is readily realised when we consider the distribution of minerals of economic importance; in short, man cannot put a coalfield where a coalfield has not already been provided by nature. This is true of all minerals. The economic activities of a country are often to a large degree determined by its mineral resources. Foreign trade may be concerned with the export of minerals or mineral products or with the import of similar materials to overcome the deficiency in home resources. The farmer who puts lime on his land is attempting to supply to the surface of the ground a mineral constituent in which it is deficient. But apart from small changes of this kind man can do little to alter the natural restrictions imposed on him by geology and structure.

**4. Climate and Weather.**—What clothes are you wearing at the moment? Making a certain and moderate allowance for vanity (gentlemen may omit this) and circumstances, it may be suggested that your selection in clothes has been determined in the main by the day's weather. Look round the room: is there a fire or radiator, are the windows closed or wide open, have you got cold feet, as I have at the moment of writing these words, since it is already chilly though September only? The answer to all these questions will illustrate the influence of day-to-day weather on our everyday life. But the fact that a room has a fireplace or a radiator, or indeed has windows at all, has been determined by the climatic conditions of the country. Now look for evidence of the influence of weather and climate on the life of the country as a whole: the crops which are growing in the fields, the trees, their character and importance, the possibility of their variation are all determined by climate. From my study window here in Surrey I see the trees waving in the breeze, but no banana palm meets my eye nor orange tree bows down with golden fruit; the climate of the country prevents such a sight. On the other hand, in the next room there is a bowl of bananas and oranges representing the commercial activities of two countries enjoying different climatic conditions from our own. Both weather and climate are factors of fundamental importance in Geography. Man's inventiveness has often been directed towards overcoming the disadvantages of

climate. The clothes which we wear, the heating of our houses, umbrellas, mackintoshes and goloshes are all protection against too much cold or too much wet. On the other hand, with the reservoir and irrigation man has made an attempt to overcome the disadvantages of too little moisture: in the other direction he has not gone so far; we do not know how to prevent rain and many countries suffer from excessive rainfall. Until very recently it has been easier with a fire or central heating to overcome the disadvantages of excessive cold than it has been to overcome the disadvantages of excessive heat, but now we have refrigerators and air-cooled houses.

**5. Vegetation and Soil.**—The vegetation with which Nature has clothed the surface of the earth is, in many respects, an index of the interaction of the foregoing factors. It varies according to the position of the area or the country, according to the physical conditions, according to the climate; it may be urged that it varies particularly according to the soil. But the soil itself is the surface layer of the earth's crust which has been produced as a result of (a) the geological structure that supplies the rock material, (b) the action of climate, and (c) the type of vegetation which has been growing there. The variation of natural vegetation from one part of the world to another is a matter of fundamental importance to the geographer. It is, indeed, possible to distinguish about twelve great regions in the world as a whole, each of which has its characteristic form of vegetation and each of which may be described as a major natural region. If the character of natural vegetation is to a large extent determined by factors of soil and climate, so is the artificial vegetation or the crops cultivated by man. Each of the great regions of natural vegetation has its own characteristic crops. By careful breeding and selection it is possible to extend the range of crops, but only to a limited degree; we have already pointed out the impossibility of growing cocoa, rubber, bananas or other tropical fruits in England: it is similarly impossible to grow some of our English crops in the tropics, but clearly man has done a great deal to alter the natural vegetation. He has entirely removed it over large areas of the earth's surface by clearing forests or ploughing up prairies; over much of the British Isles it is doubtful whether there is any of the original vegetation left. But in other areas it is

largely true to say that man is still almost a slave to this particular factor of the environment. The primitive jungle tribes of the South American and Central African forests have great difficulty in clearing a small patch for their cultivation and the primitive conditions of their existence are the result in large measure of the forest environment in which they are compelled to live.

**6. Animal Life.**—The connection between animal life and vegetation is clear whether we take wild animals or domestic animals. We naturally associate the agile monkey with life in the trees, the speedy antelope with the open grassy plains; we realise readily too the dependence of the sheep farmer or the cattle farmer on the presence of suitable pasture. Thus

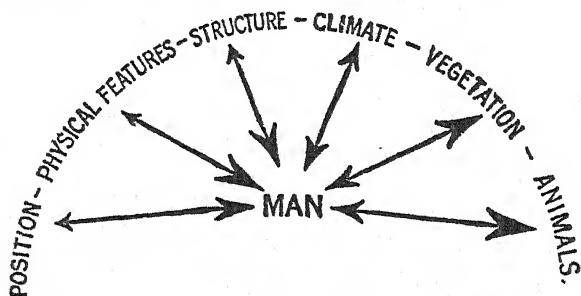


FIG. 1.—Diagram showing the influence of the geographical factors on man and man's reciprocal influence on the factors of the environment.

we may say that the native animal life and to a large extent the character of the domestic animals is determined by all the preceding geographical factors. In some senses man himself is one of the animals and his life is ruled by the factors of environment; but from another point of view man alone can be described as a thinking animal, which having taken thought is able to take action. Thus the factors of his environment do not *determine* the details of the life of man however much they may *influence* him, and man must be considered by the geographer as occupying a unique position. The whole position may really be summed up in the diagram shown in Fig. 1, where the barb to the arrows indicates the influence of each of

the factors concerned on man, or at the other end the influence that man is able to exert on the particular factor of the environment. The study of Geography is essentially the study of the environment, the environmental factors and of the relationship between man and each of these factors. We can see now the relationship between Geography and the other sciences. It is the business of the geologist to study the geology and geological structure as such, it is the business of the climatologist and meteorologist to study climate and weather as such, of the botanist to study vegetation, and of the zoologist to study animal life; it is the concern of the geographer to take just those portions of each science as may be required in his study of the relationship of each to the environment, and of each to man as the central figure.

## CHAPTER III

### Environments

If we take two people, one living in London and one in Southampton, it is clear that in many ways their environments are similar; we cannot imagine the man travelling from London to Southampton worrying about a different climate and whether he ought to go and buy some different clothes before making the journey. Nor would he find any marked differences in the method of house construction between the one place and the other, the arrangements for heating and lighting would be similar. So it is if we compare, for example, England and Scotland, they are different in a few respects but very similar in others. On the other hand, we know that if we take a holiday, let us say in the south of Italy, we shall not only find it very much hotter in the summer, but we shall find that the climate has resulted in quite a different series of cultivated crops and, as a result, the country grows such fruits as the orange, lemon and olive, which could not be grown in this country. So there has been evolved the conception of a series of major natural regions, of major environments. We can divide all the land surface of the globe into about twelve areas and we can define those areas either in terms of climate or of the vegetation which has resulted. The late Professor Herbertson of Oxford was the first geographer to do this (in 1905), and we find that the major natural regions of the world are not only interesting but very useful. We find, for example, that the climatic conditions of parts of Canada are repeated exactly in Russia, and so lessons learnt by scientific experiment in the one area can be applied in the other. If the Canadians are very successful in breeding a new type of wheat which will ripen farther north and with a shorter summer than existing varieties, the results of these experiments are immediately of great value to the Russians: they can apply the lessons learnt simply because the same major



environmental or climatic conditions are similar in Canada and Russia. On the other hand, serious mistakes have often been made in the past in trying to transfer customs or procedure from one part of the world to another where they are not suitable. Thus some of the early English settlers in Ceylon saw no reason why they could not grow the crops which they had grown in England, so they took with them oats and barley and wheat and tried to grow them. But the climate was far too hot; the crops would not grow. It has taken a long time to find out some of these distinctions: for example, when the Pilgrim Fathers went from some of the country districts of England across the Atlantic and settled in New England they cleared the forests and built for themselves homes and cultivated the ground believing that they had the same soil and climatic conditions as they had left behind them in England. There are many areas where they settled where the soil was very poor, and to-day we find that much of the land that they so laboriously cleared is being abandoned; it is not good enough, and really has never been good enough, for cultivation.

Many important commercial products can only be produced in one type of climate, that is, in one of the major natural regions of the world. Thus the rubber tree is a native of the climatic region of the Amazon basin of South America where it is always hot and always wet; the rubber tree cannot be grown where there is a long, dry season or where there is a cold season, but it can be grown in all those parts of the world where the climatic conditions are the same as in its own home area. Indeed, nearly all the rubber of commerce comes to-day from the gigantic plantations of Malaya, Ceylon and the Dutch East Indies. Look at the map and notice that these regions are all near the equator in the same way as the original home. This distribution is not accidental, is not because efforts have not been made to grow rubber in other areas. For instance, plantations were started near Calcutta, but although it is hot there, there is a long dry season which makes it impossible to cultivate this particular tree. Thus we find that the study of the natural regions of the world is important as indicating areas where possible extensions of cultivation of a given crop may be made. We will proceed now to study these major natural regions in order.

## I. NATURAL REGIONS OF LOW LATITUDES OR OF LANDS NEAR THE EQUATOR

1. **The Equatorial Regions.**—As its name implies, the Equatorial Climate is found in a belt on either side of the equator, extending roughly between  $5^{\circ}$  north and  $5^{\circ}$  south of this line. It is sometimes called the Amazon type of climate because it is found in the typical form over the greater part of the Amazon basin. The characteristic vegetation is tall, evergreen forest where it is always wet and always hot and the forests are never leafless. It might be called also the climate of the hot, wet selvas (using a local name for the Amazon forests). The temperature is high all the year and there is very little variation between the hottest month and the coolest month, and there is usually quite a small difference between day and night. Usually the average for the year is about  $78^{\circ}$  or  $80^{\circ}$  F., and the range between the hottest and coldest month is usually less than  $5^{\circ}$ . The equatorial region is often regarded as the hottest in the world, but although the atmosphere is always hot and steamy and the temperature is uniformly high, the thermometer very rarely rises above  $100^{\circ}$  F. and frequently does not rise above  $90^{\circ}$ ; on the other hand, it does not as a rule fall much below  $70^{\circ}$ . In the interior of the great forests there is little movement of the air, the climate is very tiring, but in situations near the sea or on islands it is often very pleasant, for the land and sea breezes give a welcome movement of the air—a cooling sea breeze by day and a land breeze by night. The rain falls at all seasons of the year and there is no dry season except in relative amount. The rain is usually that known as convectional rain: in the early part of the day bright sunshine causes much evaporation and an upward current in the atmosphere; the ascending moisture-laden air becomes cooled and clouds form during the afternoon. The rain which naturally follows is often accompanied by thunder and falls in torrential downpours, usually of short duration. By the evening the sky is clear again. There are usually two seasons in the year which are wetter than the rest; in most cases the rains are at their maximum a short while after the period when the sun is shining vertically. Typical of the equatorial lands is the Belt of Calms or Doldrums where there is no marked wind or wind direction. Island stations

have light and variable breezes and some regions near the equator are influenced by the Trade winds or Monsoon winds which are typically developed farther to the north or farther to the south. The equatorial region is nearly always one of heavy rainfall, 80 inches of rain a year is about a typical rainfall. Eighty inches of rain and eighty degrees of temperature are things to remember in connection with the equatorial region. If we examine the map we find that the equatorial climate is found in three main areas :

- i. the Amazon basin of South America ;
- ii. the Congo basin of Central Africa ;
- iii. the islands of South-Eastern Asia and the neighbouring parts of the mainland, including Malaya.

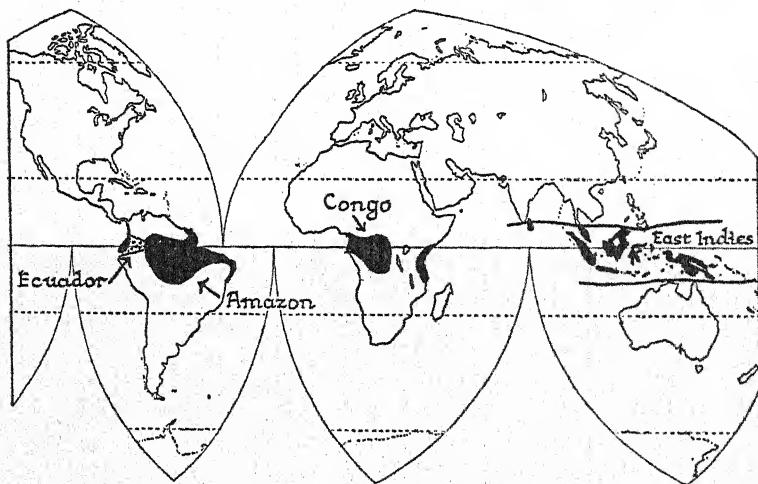


FIG. 2.—The Equatorial Regions.

Many areas are clearly "transitional" ; thus the Guinea coast in West Africa can be classed either as "equatorial" (its forests are of that type as are those of the West coast of India) or as the wettest part of the "tropical" region (division (a) of p. 18).

In some parts of these regions there are mountainous tracts, and the effect of elevation is to lower the average temperature and sometimes to increase the range. In high plateaus near the equator the temperature is very much lower and so the "Ecuador type" of climate is found, typically on the high plateau of Ecuador at an elevation of 8 to 10,000 feet. Here the average temperature is only 55° F., and this has been described as the "land of eternal spring."

The always wet and always hot climate of the equatorial regions produces a very rich, luxuriant growth of forest vegetation ; there is a fierce struggle, not for moisture of which there is an abundance, but for air and light. The hot, wet forests consist of a variety of giant trees ; they nearly all have tall unbranched bolls with a crown of leaves at the top, forming a close mass often so thick that little sunlight reaches the ground. This is particularly the case in South America ; the forests of equatorial Asia and Africa are more open. Most of the trees have short resting periods to shed their leaves, but the resting periods come at different times with different trees, so the forest is never bare. Very many of the trees are of hard-wooded species and there are two major difficulties in exploiting these forests. One is the great variety of trees, so that the extraction of one or more particular types of timber is extremely difficult. The other is the character of the timber itself—usually hard and costly to work though often forming magnificent “cabinet” wood. Thus we find some towns such as Manaos in the heart of the equatorial forests of South America actually import softer, more easily worked, building timber from the timbered regions of North America. The struggle for light and air has resulted in the existence of large numbers of woody climbers ; the trees by which these have climbed may afterwards decay and leave the climber hanging from the branches of neighbouring trees in the heights above and the coils forming tangled masses on the ground. This is one reason why the equatorial forests are so difficult to penetrate. Many smaller plants, including orchids and ferns, find a foothold in the higher branches of the trees (growing thus as “epiphytes”) and thus reach the light. In the denser forests the ground may be almost clear of vegetation except decaying matter, but in open forests there is a luxuriant growth of broad-leaved herbs. In the denser forests the animal life is almost restricted to the treetops and all groups of animals can exhibit members especially adapted to this particular habitat. In the dense Congo forests the world-famous pigmies may actually build their habitations in the trees. Where man is concerned the equatorial climate has been well described as a good servant but a bad master. In the dense forests of South America and much of the Congo the climate is still the master ; the close, steamy heat causes man to

deteriorate in these "regions of debilitation," and the forests are sparsely inhabited by backward races, backward both physically and mentally. Of such peoples the American Indian tribes of the Amazon and the pigmies of the Congo are the outstanding examples. On the other hand, particularly in the more open stretches of forest where the steamy heat is tempered by a situation near the open, native races have largely conquered climatic conditions. The Malays and the Javanese enjoy a life of comparative ease, but also of comparatively high culture. They have, it is true, many difficulties in life. The trees are hard-wooded and difficult to cut down and difficult to burn; a vegetation of weeds springs up rapidly on cleared ground and the cultivated patches become choked with grass, bamboo and thorny bushes. Another great difficulty of equatorial forests, especially on hillsides, is that of soil erosion. When the trees have been cleared away the torrential rains completely remove the soil and leave the bare surface of rock. It is the white man who has really made the equatorial climate his servant, particularly in Malaya, Ceylon and the East Indies. The forests there have given place to plantations of rubber, oil-palm, cacao (cocoa) and sugar. For the white man, too, these are far from being the unhealthiest or most uncomfortable parts of the world. The great danger is the absence of variation in the climate; when a man becomes run down there is no cold season to permit him to recover his normal health—as we say "to buck him up."

**2. The Tropical Regions and (3) the Tropical Monsoon Regions.**—The word "tropical" is commonly used in such a loose way that it conveys little more than the idea of heat, but geographers have assigned a more precise meaning to the word tropical as applied to the tropical climate. Another climate that closely resembles the tropical climate is the tropical monsoon climate of India and neighbouring regions, where the rainfall occurs in rather a different way. The tropical and tropical monsoon climates are found typically within the Tropics on either side of the equatorial belt. One particularly extensive area is the Sudan of Africa, hence the name—the Sudan type. In the typical tracts the vegetation is grassland or grassland with scattered trees, and hence it is sometimes called Tropical Grassland climate or Savana climate (a savana being a grassland with scattered trees). In monsoon India, on the other hand, forests of different

types are more typical, but they all agree in that they lose their leaves in the hot season except in the very wettest regions. In contrast to the equatorial regions there is a marked difference between the temperatures of the hot and cool seasons of the year. Around the equator or in maritime situations where the rainfall is heavy, the difference of temperature may be small, but in other parts there is frequently as much as  $30^{\circ}$  or  $40^{\circ}$  between the hottest and the coldest months. The difference between day and night temperatures is correspondingly large.

The tropical regions lie between the equatorial forests on the one side and the hot deserts on the other. From the point of

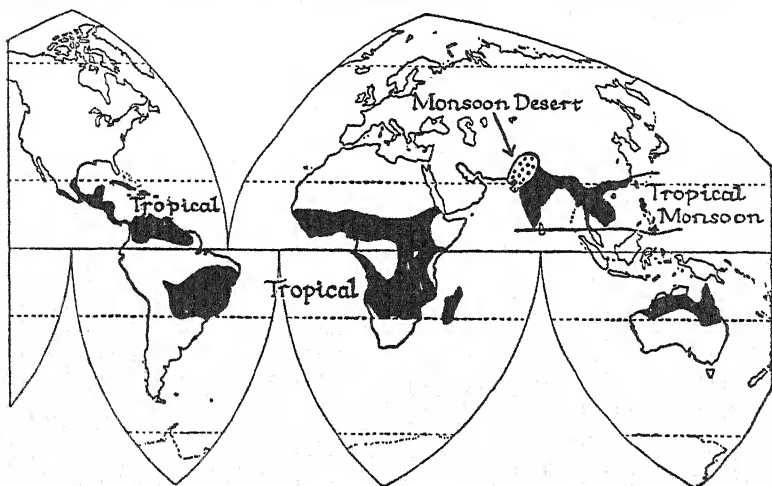


FIG. 3.—The Tropical and Tropical Monsoon Regions.

view of rainfall there is a gradation of from 80 inches a year or more on the forest edge to 15 inches on the other edge; at some of the wettest stations in the tropical belt the rainfall may be as much as 200 inches a year. There is, however, a distinctly dry and a distinctly wet season, and it is usually possible to distinguish between :

- (a) a cool dry season followed by
- (b) a hot, dry season when the land becomes greatly heated and the highest temperatures are recorded, and
- (c) the rainy season.

With the coming of the rain begins a lowering of temperature, but the rain comes in what would be in England the spring and summer of the year, while the winter months or cooler months are practically rainless. It is this season of intensive rainfall which favours the growth of grass, but where there is sufficient moisture to give a constant underground supply trees also flourish. Thus in tropical and tropical monsoon lands we may distinguish four belts of vegetation :

- (a) Near the equatorial belt, provided the rainfall is sufficiently heavy, there is a forest differing but little from that of the equatorial belt.
- (b) Where the rainfall drops below about 60 or 80 inches this passes into a forest in which the trees are deciduous, losing their leaves or having a resting period during the heat of the year. The forests of Burma and parts of India famous for their teak, sal and other timbers belong to this region, as do many of the forests of West Africa.
- (c) Then comes the characteristic grassland of so much of Africa, the great stretches of grassland with occasional trees, or savana. In India, where it is too dry for the growth of monsoon forest, its place is taken by rather a scrubby kind of woodland with a limited amount of grass.
- (d) Towards the desert areas the vegetation becomes poorer and poorer and the grassland passes into desert, the trees into spiny bushes until the whole place is a great desert.

In the drier parts the reliability of the rainfall from one year to another is a serious matter. Some years the fall is sufficient to ensure good crops, whilst in other years a poor rainfall results in famine conditions. It is in the drier parts of some of the tropical grasslands that we find some of the great famine regions of the world.

The animals in the equatorial belt were especially adapted for climbing, an occupation which would be of little use in grassland, where there are instead two main groups of animals—

- (a) the swift-footed, vegetable-eating animals such as the antelope and giraffe that take refuge from their enemies in flight ;
- (b) the carnivores such as the lion and the leopard which prey upon the members of the first group.



Man in the savana is primarily a hunter; just as the grassland is able to support vast numbers of grass-eating animals, so man is able to rear great herds of cattle and so becomes a pastoralist. The natural grass which flourishes in the savana may be replaced by the cereal grasses and so man becomes an agriculturalist. We find therefore that the more important crops of the tropical regions, like the occupations of man, vary (a) with the amount of rainfall and (b) with the degree of development. As an example of a very densely populated region we may take India and for the more sparsely populated tract we may choose many parts of Africa, whilst sparsely inhabited regions with this type of climate are found also in South America.

(a) *Areas with more than 80 inches of rain a year.*—In many of these rice is the staple food of the people and almost the only crop, as in India. The main danger is not a lack of water but



FIG. 4.—Diagram showing gradation of vegetation with rainfall in tropical lands.

one of flooding: protective works are often necessary to prevent floods.

(b) *Areas with between 40 and 80 inches a year.*—Here rice is again an important food crop, largely replaced by maize in Africa, while sugar and oil-seeds are other important crops.

(c) *Areas with between 20 and 40 inches of rain.*—These may be described as dry belts. The land is normally covered with scrubland, thorn forest or grassland; different types of millet or Guinea corn are the staple grains of the people as in all the warmer parts of India and in tropical Africa, though in regions such as northern India wheat and barley may be grown as winter crops. Sesamum and various oil-seeds are cultivated



and cotton is a characteristic crop. There is always the danger that the rain may be less than average and give rise to famine.

In the tropical regions cattle are reared in numbers and in Africa form virtually a measure of wealth of individuals or tribes. Unfortunately quantity rather than quality is the criterion adopted. In many parts of Africa the destructive tsetse fly is very much in evidence and limits cattle rearing. Sheep may be important as they are in India. The regions of the world at present producing cereals and wheat in large quantities for consumption in the densely populated areas of Europe are the Temperate Grasslands, and there is less and less land available for rearing animals for meat. Thus in the near future it is probable that the Tropical Grasslands will be more and more utilised. They include some of the still largely undeveloped stretches of the world.

**4. The Hot Desert Regions.**—The hot deserts lie on the poleward side of the regions with a tropical or tropical monsoon climate. They are confined to high-pressure belts where the currents of air are descending and the winds blow outwards so that there are no moisture-laden winds coming in from the ocean. They are mainly on the western side of the land masses because on the eastern side a certain amount of rain is caused in these latitudes by the Trade winds. In the hot desert regions there are few clouds and the sun pours down with unmitigated force on the unprotected soil, while the absence of cloud also permits rapid radiation of heat and the nights are often very cold. There is thus a big contrast between day and night and between the hot season when the sun is vertically overhead and the cold season. There is further little or no rain to exercise a cooling influence on the temperature; many of the deserts are low-lying so that there is not even altitude to temper the heat of summer, with the result that the highest temperatures of the world are recorded in these regions. Thus El Golea in the Sahara has an average temperature of 93° in July, whereas in January its average is only 39°, about the same as London for the same month. Jacobabad, in north-west India, has one of the highest recorded average temperatures in the world for the month of July—98° F. On the margins of the desert nearest the equator the desert proper fades into semi-desert as soon as the rainfall reaches 9 or 10 inches a year; this in turn passes

gradually into the grasslands of tropical regions. On these margins of the deserts such rain as does fall comes mainly in the same season as it does in the tropical lands, that is to say, in the early summer. On the poleward margins, on the other hand, the desert fades gradually into Mediterranean scrubland where the rain comes in winter. Cairo with 1.3 inches of rain a year is an example of this type. The largest deserts occur in the Northern Hemisphere, for the simple reason that the land masses are there broader. The great Sahara stretches almost continuously from the Atlantic to the Red Sea and desert eastwards over Asia to the borders of Baluchistan and the great

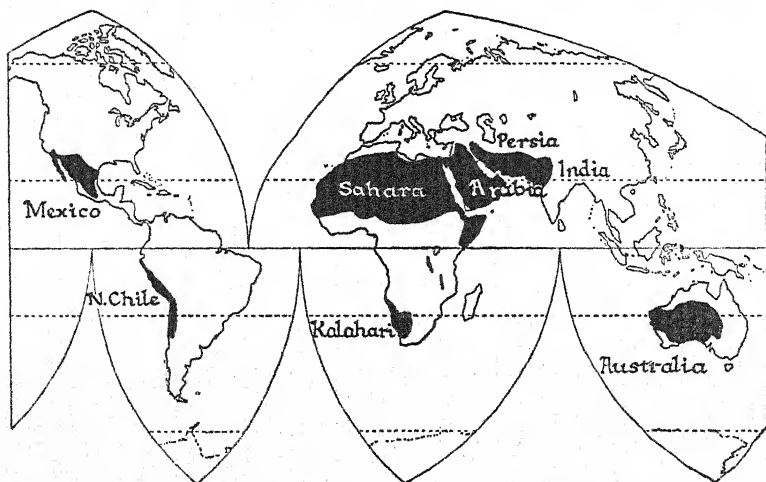


FIG. 5.—The Hot Deserts of the World.

Indian desert. North America has the deserts of the Mexican and United States borders, South America the Peruvian and North Chilean deserts that occupy the area between the Andes and the Pacific Ocean. In South Africa the Kalahari Desert stretches right to the Atlantic Ocean, whilst in Australia a large area has a rainfall of less than 10 inches a year, the great dry heart of the continent.

There are few deserts where absolutely nothing grows; over much larger areas there is some vegetation often sufficient to support at least some animal life. The plants have various

means of storing water ; some have very long roots which go down to great depths and so find water, others have special stems and leaves in which water can be stored up, while many are provided with spines and thorns to prevent their being readily eaten by animals. Of special importance are of course the fertile areas or oases occupying hollows where an underground supply of water comes sufficiently near the surface to be accessible to vegetation. Some oases may consist merely of a clump of trees surrounding a pool or well and where the typical tree is the date-palm. These are the oases dear to the popular imagination, but other and more important oases are actually very large areas of several hundred square miles and may support a big population as in many of the oases in the heart of Arabia.

The sparse population of the deserts falls into three groups :

- (a) The wanderers who move about from place to place, in the old days with camels, or for shorter journeys with mules, and act as carriers of goods from one desert margin to another, or at other times form bands of nomadic robbers.
- (b) The settled people of the oases who devote themselves to growing grain, rearing cattle, sheep, goats, horses and camels, and the cultivation of such desert plants as the date-palm. To this group belong many of the Arabs.
- (c) The settled population of miners, attracted by mineral deposits independently of climatic conditions, as for example in the nitrate fields of Northern Chile or the goldfields of Western Australia.

In the desert regions we can trace some other rather interesting influences of climatic conditions on man. The desert has often produced people with a philosophical outlook, such as the ancient Egyptians and the Arabs, learned in Mathematics and Astronomy. Over long periods the inhabitants of oases may live peacefully and happily, but the result of a dry year, or especially a succession of dry years, or the failure of the underground water supply, is to drive the inhabitants abroad in search of other means of sustenance. Many racial migrations due to these factors may be traced in the pages of history, the arrival of the Shepherd Kings in Egypt, the wanderings of Abraham which

led him to the Promised Land, the recent migrations in Arabia and the troubled politics of that country, may all be traced to these causes.

Special mention must, of course, be made of the great irrigated areas of the desert; the Nile valley of Egypt is a special example. On the whole, however, deserts have acted as barriers to civilisation and to the movement of human beings. The Sahara Desert still separates the white and negro races of mankind, through the centuries more difficult to cross even than the open ocean.

## II. THE REGIONS OF MIDDLE LATITUDES

The equatorial type of climate stretches almost all round the globe, so too does the tropical type of climate, but when we come to regions outside the tropics we find that there is usually a considerable difference between the western and eastern margins of the great continental masses. On the western margins we find the Mediterranean type of climate which passes inland with decreasing moisture to temperate desert regions, or in middle latitudes to grasslands, the so-called temperate grasslands which are characteristically found in the interiors of continental masses. On the eastern margins we find again another type of climate and we may thus consider the east coast margins separately.

**5. The Mediterranean Regions.**—One of the most distinctive and best known of all the climatic types is that known as the Mediterranean, which is characteristic of the lands surrounding the Mediterranean Sea. Like the hot deserts which border them on the side nearer the equator, these regions are hot and dry in the summer, with out-blowing winds: in winter, however, they come under the influence of the westerly wind belt and enjoy moist, mild winters. This is the typical winter rain climate, contrasted with the typical summer rain climate of the tropical or tropical monsoon lands, but the Mediterranean regions are outside the tropics and so on an average are cooler. Sunshine is a typical attribute of Mediterranean lands, almost cloudless skies in summer and even in winter clouds are less numerous than would be expected.

The Mediterranean climate is restricted to the western sides of the continents, roughly between latitudes  $30^{\circ}$  and  $45^{\circ}$ . The

largest area is that found round the Mediterranean Sea, while others occur in North America (parts of California), South America (Central Chile), South Africa (South-Western Cape Province) and Australia (south-west of Western Australia, South Australia and part of Victoria). Here during the hot summer the Trade winds in all cases are blowing off-shore. A little reflection will show that a typical Mediterranean climate could not exist on the eastern side of a continent where the Trade winds blow from the ocean and are moisture laden. Within the Mediterranean region there is considerable variation in the details of the climate especially round the large Mediterranean Sea. Here as one goes eastwards the winters tend to be colder, but the coldest month has usually an average temperature of over  $40^{\circ}$ , whilst in the more typical parts of Mediterranean lands the coldest month has a temperature of over  $50^{\circ}$ . The summers are both hot and dry with a mean temperature of over  $70^{\circ}$ , in many areas of over  $80^{\circ}$ . We notice that there is not much difference between the winter temperature of some Mediterranean lands and, let us say, the winter temperature of southern England, but the chilliness of winter days is compensated for by the bright sunshine. The rainfall varies but is usually small, between 10 and 40 inches a year in typical cases ; on mountains with exposed situations it may be much higher.

The climate does not favour shallow-rooted herbs and grasses which require light showers during the spring and early season when they are growing ; it favours, on the other hand, deep-rooted trees and shrubs which are able to withstand the long dry summer. Many of the trees have small leathery leaves or leaves with a coating of wax to retain moisture, others, such as the olive, have leaves covered with fine silky hairs, all of which devices are designed to prevent excessive loss of moisture through transpiration in the hot summer. Some of the plants, such as the vine, have exceptionally long roots. In those regions where forests occur, even forest trees are specially protected ; the thick bark of the cork-oak of Portugal is an example of this. The dry summer conditions of Mediterranean lands are ideal for the ripening of fruit ; the typical ones are the citrus fruits, oranges, lemons and grapefruit, together with a great variety of fruits from trees which lose their leaves in the winter, such as peach, pear, apricot and apple as well as the olive, almond, fig,

mulberry and vine. Of grain certain types of wheat and barley will grow well, having been adapted by man to the climatic conditions, but the typical wheat-lands of Britain, superior alike in moisture and food conditions, are not to be found. Deficiency of rainfall is often a serious drawback, and so irrigation has played a large part in many Mediterranean regions. The Mediterranean regions have an irresistible fascination for man; the Mediterranean lands have harboured many of the great civilisations of the world, Greece and Rome, Crete and Carthage. It is held by some that the ease of living and the

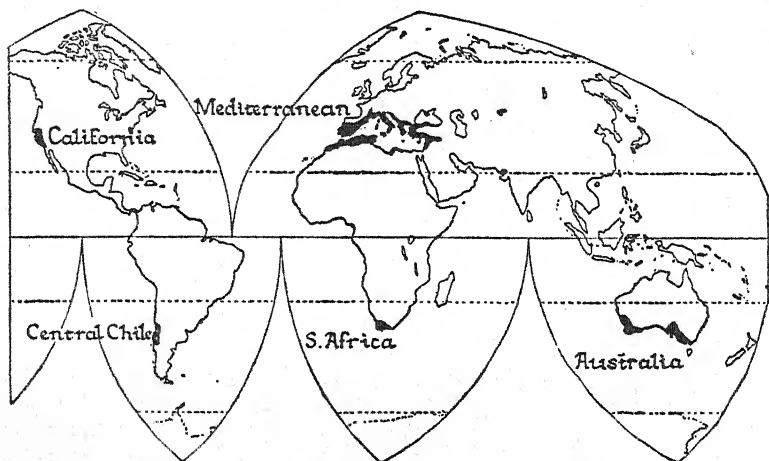


FIG. 6.—Mediterranean lands.

spirit of *laissez-faire* engendered by the climate resulted in degeneration, but the recent revivifying of Spain and Italy seem to negative this idea. In modern days there has been the lure of California and the Riviera. Most of the leading Mediterranean products are to be found in each of the regions concerned; the vine flourishes in similar climatic regions in each of the continents, so there is a rivalry between the dried grape (the raisin) of Europe on the one hand, and California, South Africa and, more recently, Australia on the other. All the various regions produce wine; of recent years there has been a great rivalry between Europe, California, South Africa and Australia

in the matter of citrus fruits. It is not very long since oranges were definitely associated with Christmas and the winter season in England, but the development of Mediterranean lands in the Southern Hemisphere, where the seasons are the reverse of those in England, has put oranges on the European market throughout the year.

**6. The Temperate Desert Regions.**—The middle latitude deserts cover enormous areas in the heart of the land-mass of Eurasia and considerable tracts of the heart of North America, but in South America they are represented only by the Patagonian Desert. In the Northern Hemisphere they occupy flat areas cut off from the ocean by mountain barriers and by distance. In general the mid-latitude deserts are characterised by high ranges of temperature and a very low rainfall. Generally, too, they form large areas of high pressure with great masses of cold air in winter and areas of low pressure with in-blowing winds in summer. The scanty rainfall occurs mainly in the summer except in those regions we spoke of above which border the Mediterranean countries—*e.g.* Iran.

Elevation and latitude permit of a subdivision of temperate deserts into several types :

- (a) *The Tibet type* occurs on the high plateaus of Central Asia, over 11,000 feet, and in Bolivia in South America, again over 11,000 feet. Many parts of the Bolivian plateau are almost too well watered to be described as desert.
- (b) *The Iran type*, characterised by the enclosed plateau of Iran or Persia, forms a transition to the hot desert type. Similar areas occur in North America round Salt Lake City.
- (c) *The Gobi or Mongolian type* occurs at lower elevations farther away from the equator.

In those stretches of desert which occur at high levels, particularly in Tibet, one gets some extraordinary conditions of temperature ; places where the ground temperature in the sun may be over 130°, whilst it is still freezing in the shade. There are similarly enormous differences between day and night temperatures. Some of the greatest known annual ranges of temperature are found in the temperate deserts.



Like the hot deserts, the mid-latitude deserts are "regions of lasting difficulty" where effort can scarcely count upon a sure reward and they remain, except where minerals have been a further attraction, but thinly populated.

**7. Mid-latitude Grassland Regions.**—The mid-latitude grassland regions are also called the Temperate Grasslands or the Temperate Continental Regions, but the word "temperate" is an unfortunate one because it is in these regions that great contrasts are found between summer and winter.

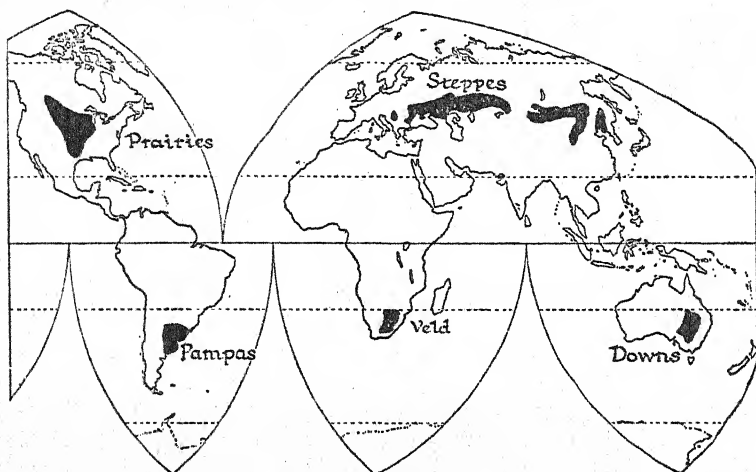


FIG. 7.—Mid-latitude Grasslands.

There are great tracts in the heart of the land mass of North America and the land mass of Eurasia which are far removed from the moderating influence of the sea. There are no cooling sea-breezes to counteract the extreme heat of summer, nor are there warm ocean currents and pleasant westerly winds to mitigate the extreme cold of winter. When the land becomes heated in spring, low-pressure areas form and the winds blow from the ocean sufficiently laden with moisture to bring a moderate rainfall. This rainfall comes mainly in the spring and summer, and affords conditions more suitable to grass than to trees. So in these regions are found the great mid-latitude grasslands of the world—the Prairies of North America, the



Steppes of southern Europe and southern Siberia. The winters are very long and very severe, the summer short but hot. Average temperatures below 0° F. are common in winter, but the three hottest months usually have temperatures over 60° and frequently over 70°. In the Southern Hemisphere the land masses are so much narrower that the extreme continental type does not occur. In South America, however, the Pampas, cut off by the High Andes from the westerly winds of the south Pacific, enjoy a comparable though much more moderate climate. In South Africa grassland is found on the surface of the lofty South African Plateau. Here temperatures are much higher, snow being a rarity, and the existence of the grasslands is due largely to elevation. The Murray-Darling basin in Australia has also a modified continental grassland climate.

In some ways the temperate grasslands form a type of region as distinctive in its own way as the Equatorial forests. The grass is usually lower and less coarse than in the tropical grasslands, but the feature which strikes the eye is the absolute treelessness of the rolling plains. The contrast, too, between the tender green of the spring, the brown, dried-up wastes of late summer, and the boundless sheet of snow in winter is characteristic of these regions of the Northern Hemisphere. The animals, as in the Tropical Grasslands, are divided into grass eaters, swift of foot to escape from their enemies, and the carnivores, amongst which man must really be classed.

Primitive man, as a native of the grasslands, is indeed primarily a hunter, as were the Red Indians of the Prairies. The second stage in human development comes with the domestication of such animals as the sheep and goat, the ox and the horse. Pastoral industries become of supreme importance, and man is nomadic, wandering about with his flocks and herds in search of fresh pastures. Droughts and a consequent shortage of pasture have repeatedly led, throughout history, to great movements of these nomadic peoples and raids on the settled population of surrounding lands. It is interesting to note that in the grasslands of the Southern Hemisphere the rearing of sheep is still the first industry, as in Australia, South Africa and parts of the Argentine. In Canada and Russia the extremes of winter cold are too severe for sheep rearing to be really successful; but a climate so favourable to native grasses has

naturally proved favourable to those grasses which man has helped to perfect as the main cereals. The Temperate Grasslands have become the world's granaries, from which the deficiencies of the industrial countries are made up. Except in South Africa, where maize is the leading cereal, wheat is the crop of first importance in international commerce, followed by barley, oats and rye. The Prairies, the Pampas, the Veld of South Africa, and the Downland of Australia are already well tilled; but there are still areas to be developed in Asiatic Russia. One large area of rather dry grassland remains undeveloped in Mongolia and Manchuria, where Chinese settlement is penetrating gradually along the fringes.

In the grasslands of the Southern Hemisphere, particularly in the Argentine and Uruguay, cattle rearing is important; but there is a distinct tendency for "bread" to oust "meat" in the competition for these lands. There are no longer the numerous huge ranches that formerly existed; they are being broken up, and wheat-farming becomes of greater importance. Hence the need for finding new lands for meat production, and reference has already been made to the importance of the Tropical Grasslands in this particular respect.

**8. East Coast Margins.**—On the western margins of the continental masses we have seen that the Mediterranean type of climate occurs. On the eastern side of the land masses in the same latitudes there are regions which in temperature are roughly comparable, but where the rainfall comes mainly in summer. These regions are sometimes called the Warm Temperate regions, but actually again the word "temperate" is not very good because of the contrasts which are often found between summer and winter. Nor is there one actual type of climate; any one of the particular regions has its own particular features and the types now to be considered are (a) the very important south-eastern states (the cotton lands) of the United States of America, (b) the greater part of China in Asia, (c) the south-eastern coastlands of Australia and (d) South Africa, and (e) the region of Uruguay and south-eastern Brazil in South America. These regions have not a single type of climate in the sense in which the Mediterranean lands have a single type. Each region is influenced by the major physical features of the individual areas. The south-

eastern States have a well-distributed moderate rainfall throughout the year, usually with a maximum in the latter part of the summer, when the rain-bearing winds from the ocean flow in towards the low-pressure areas created by the heat in the interior of the continent. The economy of this region is almost entirely bound up in the production of cotton, and it is interesting to note the northern and western limits of cotton cultivation. The northern limit can be defined by the length of the summer; cotton must have 200 days between the last killing frost of spring and the first frost of autumn. Westwards the rainfall provides the limit, and between 20 and 23 inches per year is now found to be the minimum necessary for the cultivation of cotton, unless of course irrigation is available. Central and Northern China form part of the great "Monsoon" region of Asia. The climate differs from that of India and southern China in the coldness of the winters. The rainfall, like that of India, is due to the development of a low-pressure centre, towards which rain-bearing winds from the ocean blow. While India is protected from the cold winds in winter by the Himalayas, China is not so fortunate. Bitterly cold winds blow outwards from the heart of Asia towards the sea throughout most of the winter, bringing the temperature over much of the country down to freezing-point or below. The temperature of Peking is well below freezing in January. Snow falls commonly over the greater part of central and northern China. The summers, however, are both hot and wet, favouring the growth of rice in the south, whereas millet and wheat are the principal grains farther north. Cotton is a leading crop in central China.

In the three continents of the Southern Hemisphere, climatic conditions in the three corresponding regions are somewhat similar, and sometimes one refers to the Eastralian type of climate, which is that found in Eastern Australia. The rainfall is well distributed throughout the year, with a summer maximum derived mainly from the Trade winds. But the southern continents are not broad enough to develop large high-pressure centres in winter with cold, out-blowing winds; so the southern regions are much more temperate and have very much milder winters.

Though the natural vegetation varies from country to country in the Warm Temperate climate, high forest is

typical: evergreen where the rainfall is sufficiently well distributed. These "Warm Temperate Rain Forests" often exhibit a luxuriance of growth rivalling the Equatorial forests, but they are more open. Palms and tree ferns are noteworthy in many areas. In the Gulf States there are both broad-leaved and coniferous forests; from the latter the well-known pitch pine is obtained. China has been very extensively cleared of her natural vegetation, so that it is very difficult to know what was the original forest cover. It should be mentioned that Japan has this type of climate, but in her case the conditions are

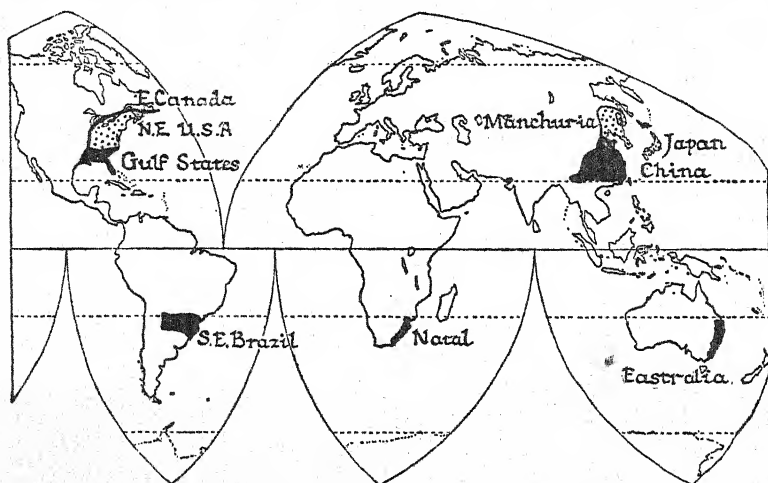


FIG. 8.—The lands of the East Coast margins.

modified by the position of the country as an archipelago. Sufficient has been said to indicate that these regions are eminently suited to human occupation and development. The valleys of central China, with their rice, cotton, tea and silk, resemble Monsoon India, or rather exceed it, in their density of population, and include the most densely populated agricultural tracts of the whole world. The density may be upward of 3,000 to the square mile—3,000 people who find their sustenance throughout the year from the small tract of land afforded by one single square mile. The Gulf States of America are the world's storehouse of cotton with the Maize Belt immediately

to the north. The eastern coastal strip of Australia and the warm coastal belt of Natal have both attracted a large population. There are considerable untouched forest areas, however, in the interior of South America—untouched largely because they are swampy and unhealthy.

### III. THE REGIONS OF HIGH LATITUDES

**9. The Deciduous Forest Regions.**—Returning now to the western margins of the continents we must consider the climate found on the poleward side of Mediterranean lands, and we come to the regions which include the British Isles in Europe and the

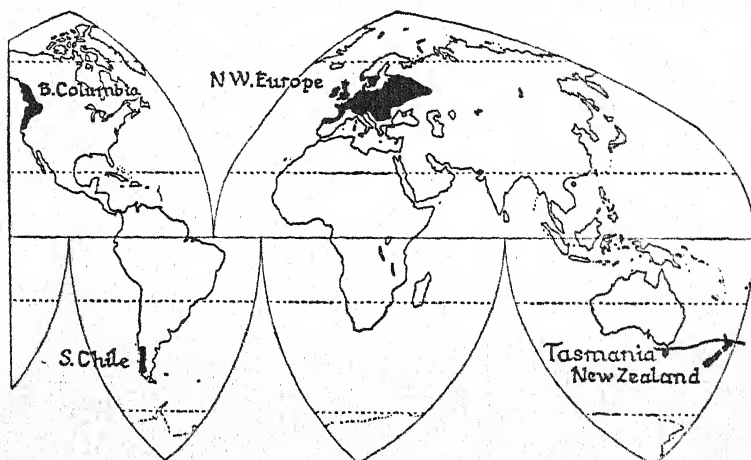


FIG. 9.—Deciduous Forest Lands.

coastlands of the north-western States and British Columbia in North America. These regions lie constantly in the belt of the variable westerly winds—the so-called “Anti-Trade” wind belt—and so are under the influence of cool, rain-bearing winds from the ocean the whole year. The two characteristics, small range of temperature between summer and winter and a well-distributed rainfall throughout the year, are at once obvious. The westerly winds do not blow as steadily as the Trade winds, but rather as a succession of eddies and whirls known in geographical speech as cyclones and anti-cyclones. Residents in

north-western Europe know well the prime importance of the cyclones and anti-cyclones in determining local weather conditions. The largest area having this type of climate is north-western Europe, but British Columbia and the north-western United States form another important area. In the Southern Hemisphere there is only a small tract in southern Chile, and no part of Africa lies sufficiently far south, whilst in Australasia only Tasmania and New Zealand (especially the South Island) are typical. In Europe, owing to the drift of warm water which is the continuation of the Gulf Stream, the mild winters characterising this type of climate extend exceptionally far north, there being no land barriers. Conditions are most truly oceanic, that is, the annual range of temperature is least, near the western coasts. The winters become steadily colder as one goes eastwards and the summers slightly warmer; so it is customary in Europe to distinguish two subdivisions:

- (a) The North-West European type, where the average temperature of the coldest month is above freezing—averaging about 40°.
- (b) The Central European type, where the average temperature of the coldest month is about or below freezing.

The rainfall is well distributed throughout the year, but the total amount varies somewhat widely. In the west the mountains are the wettest part, the plains, lying to the east of the mountain ranges, are the driest. Some parts of the British Isles have a rainfall of over 80 inches, as in the Lake District, whilst in the east of England the rainfall drops to little over 20 inches, and is as low as 18 inches in Eastern Germany.

This so-called Cool Temperate Climate is the natural home of the Temperate Deciduous Forests. In Monsoon lands the trees lose their leaves to protect them against the heat of the hot season; but in the Cool Temperate lands the trees are bare during the winter as a protection against cold. The delicately tissueed leaves are easily injured by winter frosts, and the trees have made the winter their resting period. The very name of the "fall" of the year, though replaced in England by the less descriptive "autumn," is indicative of the marked nature of the phenomenon of leaf fall. Many of the trees of these deciduous forests yield valuable hardwood timbers, more easily worked than the timbers of Equatorial lands, but hard relatively to the

softwood timbers of the coniferous forests. Well-known examples are the oak, elm, maple, beech, and birch. Deciduous forests formerly covered most of north-western and central Europe, only interrupted by highlands clothed with evergreen forests or by tracts of moorland and heathland. In North America the mixture of several species of evergreen conifers—usually predominant—gives the forests a somewhat different aspect.

The Cool Temperate climate is the one perhaps most favourable to the development of the human race. It is sufficiently cold to necessitate manual work for the maintaining of bodily warmth in winter, but the summers are never so hot as to make outdoor work unpleasant. Individuals and races seem to develop somewhat more slowly than in tropical climes, but their maturity is more permanent when it is attained. Most of the great industrial countries of the world—Britain, France, Germany, Belgium and Czechoslovakia—are situated in this region. Over the greater part of Europe the natural vegetation—the forest—has been cut down to make room for agricultural, pastoral and industrial development. All the important temperate cereals—wheat, barley, oats and rye—flourish, at any rate in the drier parts, with maize in the warmer parts. The natural fruits include apples, pears and a number of others. In the drier regions sheep flourish on the hill-pastures; in the wetter areas the grass grows richly and affords excellent pasture for cattle. The corresponding area in North America is equally suited for development except that much of British Columbia is too mountainous for settlement; and in the deep valleys which separate the mountain ranges the rainfall is often extremely low, some parts getting no more than about 5 inches a year. The mild winters of such places as Vancouver form a pleasant and interesting contrast to the severe winters of the prairies of the heart of Canada. New Zealand—sometimes called the Brighter Britain of the South—forms an interesting example of modern development in the Southern Hemisphere of this type of climate. Only Chile's area, with too great a rainfall and too great an extent of mountainous country, remains undeveloped.

**10. East Coast Margins.**—Whereas the regions we have just described occur on the western margins of the northern con-



tinents, where they are under the beneficial influence of the westerly winds, the east coasts are not climatically so fortunate. The moderating influence of the ocean prevents them from suffering the extremes of heat and cold experienced in the interiors of the continents, but the eastern margins of the great land masses are far colder in winter than the corresponding western margins. Many of the ports, *e.g.* Montreal and Vladivostok, are ice-bound, though the summers are hotter than in corresponding latitudes on the west coasts. In the north-eastern United States, the Maritime Provinces and the St. Lawrence valley of Canada, there is a well-distributed rainfall which permits of dairy and arable farming. The corresponding region in Asia, in Manchuria and Amuria, is a region where the Monsoon winds still play their part; so it is the summers which are hot and moist, the winters extremely cold and almost rainless. The land masses of the Southern Hemisphere are not sufficiently broad for this type of climate to be developed.

The forests which normally clothe the two regions of the Northern Hemisphere are of mixed deciduous and coniferous species. Like the Cool Temperate Regions of western Europe, these two tracts form "Regions of Effort," where man is rewarded in proportion to the effort expended. No one needs to be reminded of the industrial development of those portions of the United States which fall in this tract, nor indeed of the corresponding parts of Canada. The American tract has been so far developed industrially that it is no longer self-supporting in the matter of foodstuffs. The same development has not yet taken place in the Asiatic regions; indeed, Manchuria is a tract as yet considerably undeveloped. It is obvious that if such a wonderful result may be attained with this type of climate in America, there are vast possibilities in the future for Manchuria. This country is bordered in the south by over-populated China, which needs an outlet for its people. Its neighbour on the seaward side is the Japanese Empire, almost equally over-populated, industrialised and depending on foreign supplies for foodstuffs and raw materials. Obviously both nations must have a deep interest in the development of Manchuria; but it is also the Pacific outlet for the great territory of Russia. Hence three nations, China, Japan, and Russia, have a vital interest in the same tract in the Far East. As the



population is at present, Manchuria is very largely being colonised and settled by Chinese, but the development is made possible by Japanese capital, especially by that wonderful organisation the South Manchuria Railway, rivalling in the breadth of its interests and its functions the Canadian Pacific.

**11. The Coniferous Forest Regions.**—Stretching right across the Northern Hemisphere as a broad belt is a region whose average temperature is low and where the greater part of the somewhat scanty precipitation is in the form of snow. The natural vegetation is everywhere of the evergreen, coniferous

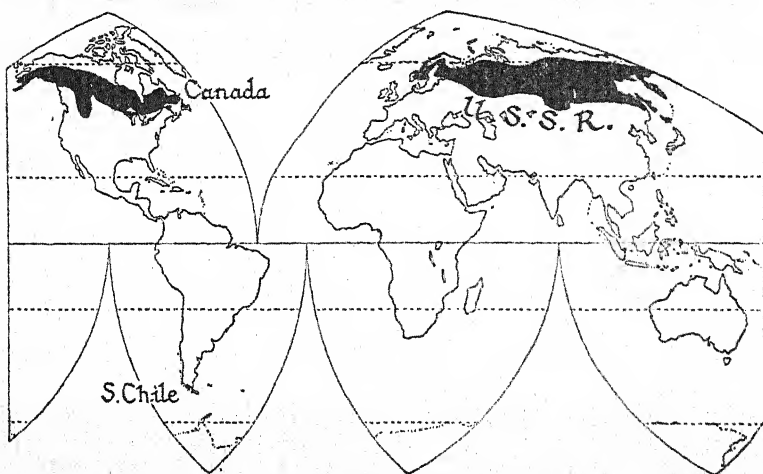


FIG. 10.—The Coniferous Forests.

(i.e. cone-bearing) forest type. The really distinguishing feature is the shortness of the summer—insufficiently long for the ripening of cereals. Certainly a little oats and barley are grown, but we are here beyond the economic limit for the cultivation of wheat. In most typical stations only one month rises above 60°, and in many cases the annual average is below 40°. In certain parts near the ocean the range of temperature between summer and winter may be comparatively small, but in the heart of northern Asia there is actually a range of over 100° F.—the greatest in the world. A similar type of climate occurs on mountain ranges throughout Europe and North

America. In the Southern Hemisphere only the extreme south of South America and the mountains of New Zealand have a climate sufficiently cold to belong to this type. Where agriculture is so little favoured, natural vegetation remains important. The majority of the trees are evergreen and coniferous. The peculiar structure of the thick-skinned resinous leaves affords adequate protection both against cold and excessive loss of moisture. The finest tree growth is in the warmer southern parts; northwards the trees become scattered and smaller or grow but slowly. Thus it takes fifty or sixty years for timber forests to regenerate in the southern margins, but up to two hundred years in the northern tracts. The Coniferous Forests, or Taiga, are the world's great storehouse of soft-wood timber, such as pine, fir and deal. The great belt of forest stretching across North America is the most important in the world; in Europe there are the forests of Scandinavia and northern Russia, whilst the same type reappears in the hills and mountains of north-western and central Europe. Across the north of Asia, that is in Siberia, the forested areas are largely inaccessible and suffer from the peculiar physical conditions of the land. The great rivers there flow northwards towards the frozen Arctic Ocean, and are themselves frozen throughout the winter. In the spring the upper courses in the warm south melt, whilst the central and lower courses are still ice-bound, with the result that flood-waters spread far and wide over the flat country and turn the Taiga or Coniferous Forest into a vast forested morass. This state of affairs is reflected in the poor condition of much of the timber.

The sparsely inhabited and less accessible regions of the Coniferous Forests are occupied mainly, before development, by hunters and trappers, for the animals of the northern forests are protected from the cold by thick fur. The main fur-producing tracts are round Hudson Bay in Canada, and in the forest regions of Siberia. In the economy of a civilised world, logging and timber working industries take first place in these tracts, the production of wood-pulp for paper being not the least important of the uses of coniferous wood. The trees are felled during the winter, dragged over the slippery snow to the watercourses, and floated down the rivers when the snows melt. Accessibility, the presence of streams suitable for floating, and the existence of

water-power for saw-mills and pulping-mills are the factors influencing development. By far the most important areas are along the southern fringes of the forest in Eastern Canada and in the countries of Northern Europe. The influence of the abundance of easily worked wood is seen in the dwellings in the forested regions, from the rough log cabins of the Canadian backwoodsmen, the timber-workers of Finland and northern Russia, to the elaborate wooden chalets of the Swiss mountain forests.

The softwood forests of the smaller countries of Europe have been worked so long that it is difficult to maintain an output of timber and wood-pulp, and certainly almost impossible to increase that output. The only two countries in the world which still have very large reserves of softwood are Canada and Russia—a very interesting state of affairs.

**12. The Tundra or Cold Desert Region.**—Within the Arctic Circle the winters are very long and very cold—there are at least some days on which the sun never appears—whilst the summers are very short though warm. Though for certain periods the sun never sets, it never rises far above the horizon. It is too cold for forest; the natural vegetation is moss and lichen, with stunted bushes and small trees near the forest limit. Agriculture is practically impossible, for the ground is frozen for three-quarters of the year. The short, hot summer does, however, sometimes produce an amazingly prolific growth of grass and herbs, which can take advantage of the continuous sunshine of midsummer; hence the introduction of the name “Arctic Prairies,” substituted in Canada for the old term “Barren Lands,” which scarcely does justice to the region.

Though they are at present almost uninhabited, there seem to be future possibilities for the development of these lands, by the breeding of reindeer or caribou, the natural animal inhabitants, whose flesh and skins have a very definite economic value. Northwards the Tundra lands pass into regions of permanent ice and snow, the plateau of Greenland representing the ultimate development of the extreme type of Cold Desert Climate. To this the Antarctic Continent corresponds in the Southern Hemisphere.

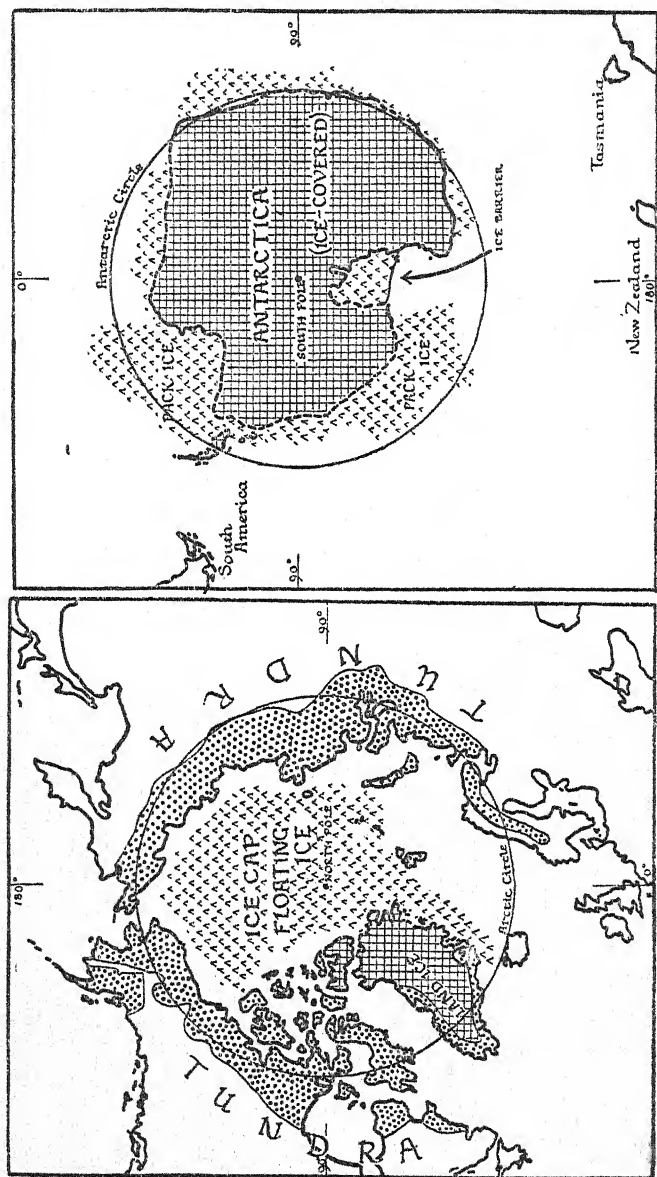


FIG. 11.—Tundra and Cold Desert Regions

#### IV. HIGHLAND REGIONS

In ascending a mountain in the tropics we may be said to pass through, in a very broad and general sense, the main vegetation regions as we should find in journeying from the equator polewards. Thus the tropical forests and grasslands give place upwards, very frequently, to a belt of hardwood trees, then to a belt of conifers above which come the alpine pastures which are the counterpart of the arctic pastures just described. There are other differences which are due to the effect of elevation and the consequent rarefaction of the atmosphere. From the point of view of Commercial Geography it is important to remember that, in a mountainous country, a wider variety of products can be grown than might otherwise be possible; thus we find on plateau regions in the Tropics it is possible to cultivate crops which are otherwise only grown in temperate latitudes. It is possible too, as, for example, on the plateau of Kenya, for white settlement to take place in a region which would otherwise only be suitable for tropical agriculture.

## CHAPTER IV

### Commodities

#### I. THE COMMERCIAL GEOGRAPHY OF A COMMODITY OF ANIMAL OR VEGETABLE ORIGIN

It is difficult to pick up an examination paper which does not contain some such question as: "Give an account of the world production of two of the following commodities"; or "Give an account of the geographical conditions necessary for the production of one or two of the following commodities." It is possible to lay down general lines along which one should study the conditions of production of commodities of animal or vegetable origin. The matter should be dealt with in the following three phrases:

(a) Production.

(b) Preparation or manufacture, and transport.

(c) Markets and consumption.

(a) *Production*.—For every commodity there are certain geographical conditions, particularly of climate, which are necessary for production, and one finds that, as a rule, any given commodity can only be produced in one or more of the regions which have been described in the last chapter. Thus we must learn first of all the geographical conditions of climate which are necessary or desirable, and in the case of commodities which are vegetable we may have conditions of soil which are required or desirable, and in the case of the animal commodities other conditions which are necessary. Thus we find, because of the climatic conditions which are necessary, rubber could and can only be grown in the equatorial regions and in regions which closely resemble the equatorial in climate. This gives us the *ultimate or geographical limits* of production. Often, however, it is not possible to produce the commodity throughout these regions for economic reasons; it may be that the type

of labour required limits the production possible ; and so these economic factors where present should be mentioned, for they determine the limits within which, at any given time, production is *economically* feasible. This leads us, then, to discuss the *present* or *actual limits* of production. We find that the bulk of the world's rubber is produced in Ceylon, Malaya and the neighbouring parts of Asia and the Dutch Indies, in a small portion only of the geographical region within which cultivation would be possible. Thus the production of a commodity should be studied in accordance with its (a) geographical limits, (b) economic limits, and (c) actual limits.

(b) *Preparation or Manufacture*.—We must consider very briefly the processes which the raw material undergoes in preparation for consumption. Sometimes these are carried out in the areas of production ; sometimes the commodity is sent in a raw state to the area where it will be consumed. It is necessary, at this stage, to study the conditions of transport, especially where special conditions are necessary, *e.g.* the refrigeration and cooling machinery which are necessary in the case of meat and fruit. It is convenient here to distinguish between the producing countries and the exporting countries, for in many cases a commodity is produced in large quantities but not exported.

(c) *Markets and Consumption*.—It is desirable to consider the areas of import and markets for the commodity concerned, dealing if required with manufacturing processes carried on in the importing countries.

We will now deal with the principal commodities of animal and vegetable origin along these lines.

## II. THE CEREALS

A universal need of man is for food, and foremost among the natural food crops is some form of grain or corn ; grain forms an important part of the diet of over 99 per cent. of mankind. Enormous quantities of grain are also grown as food for those animals which have been domesticated by man. We can test the relative importance of the grains by the area occupied by each or by the production, but it must be noticed that only in the case of wheat is a very large proportion of the crop exported.

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Crop.	Acreage in millions of acres.	Annual production in millions of metric tons.	Percentage of total exported.
Wheat . .	330	125	20
Maize . . .	200	125	6
Oats . . .	150	75	2
Rice . . .	200	125	4
Rye . . .	120	35	3
Barley . . .	100	40	7

## CONVERSION TABLES.

1 metric ton=10 quintals of 100 Kgs. each=1,000 kilograms  
=2,200 lbs.=36.7 bushels of wheat (approx.).

1 ton avoirdupois=2,240 lbs.=1,016 Kgs.=37.3 bushels of wheat (approx.).

1 quarter (wheat)=8 bushels of 60 lbs. each nominally.

1 hectare=2.47 acres.

Yield in quintals per hectare  $\times 1.5$  = yield in bushels per acre approx. (wheat, maize or rye).

1 bushel of wheat averages 60 lbs.

1 bushel of barley averages 56 lbs.

1 bushel of oats averages 39 lbs.

1 bushel of maize averages 60 lbs.

1 bushel of rye averages 60 lbs.

1 bushel of paddy averages 45 lbs., of rice (husked) 67-68 lbs.

From the point of view of world production wheat, rice and maize are of almost equal importance, but wheat is by far the most important as far as international trade is concerned; barley is the only other crop of which a percentage in some years approaching 10 is exported. Of the cereals not in the table the most important are the various small grains known as millet which form the staple food of the native population of most of the drier parts of tropical and sub-tropical Asia and Africa. It may be seen that the cereals fall into two main groups:

(a) The cereals of the Cool temperate lands: wheat, barley, oats and rye.

(b) The cereals of Warm temperate and tropical lands: rice, maize, millet and wheat; wheat in tropical lands is grown as a winter crop.

**Wheat.**—Wheat is a crop which has been cultivated by man for many thousands of years; it was the staple food of the



Egyptians four thousand years ago and was probably known to Stone Age man. Modern varieties have been evolved to meet the special local requirements of climate, soil and man's taste or requirements.

*Conditions of Growth.*—The best soils for wheat are heavy loams or light clays, but light sandy and chalky and clay soils may also yield good crops providing they are rich in plant food. Good drainage is essential, and the best wheat lands, such as the Prairies, are those which are gently undulating so that they are suitable for extensive cultivation with mechanical means of ploughing, sowing and reaping. Wheat is an exhausting crop, and in the older countries such as Britain it is grown in rotation or with the help of systematic manuring with sulphate of ammonia, nitrate or farm manure. The rich black soils (chernozems or black earths) of the European steppes and the American prairies are among the soils most naturally suitable. Climate is more important than soil in the cultivation of wheat. The weather must be moist and cool when the seed is germinating and during the early growth, for the ultimate yield depends largely on the number of stalks which are formed, and it is only in cool, moist weather that the plant will tiller well or form a number of stalks. Warm, bright weather is required when the heads are formed and a little rain to swell the grain before ripening, and finally a warm, sunny harvest.

There are two main groups of wheat :

(a) *Winter Wheat*, known in America as "Fall" wheat, which is sown in the autumn or fall, lies in the ground, often protected from frost by a layer of snow, during the winter and begins to grow actively in the spring. Winter wheat can only be grown where the cold of winter is not so intense as to freeze the ground hard and injure the young plants. Thus cultivation is possible in England but not in the Canadian prairies.

(b) *Spring Wheats* which are not sown until the spring, although they are ready for reaping at the same time as the winter wheat. These are grown where the winter cold is more severe, as in the Canadian prairies.

Wheat is essentially a grain of mid-latitude or temperate lands ; it can be grown in parts of the Tropics, but only as a winter crop. In India most of the wheat land is actually outside the Tropics, but the cereal is cultivated there by planting the

seed in autumn after the rains, allowing it to grow during the cold season and harvesting the crop before the extreme scorching heat of the hot season begins. Towards the poles the cultivation is limited by the length of the growing season. Most of the great wheat lands have three months with an average temperature of over 60° F., but the Canadians and Russians have made great efforts to perfect varieties of wheat which will ripen in the short summer of northern latitudes, and have succeeded in producing a wheat which will ripen in a growing period of 90 days, roughly 90 days from the last frost of spring which is severe enough to damage the grain to the first of the severe frosts of autumn.

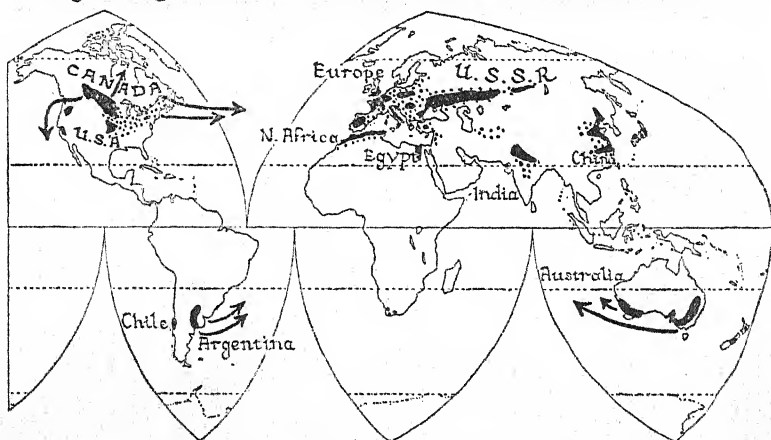


FIG. 12.—The wheat-growing countries of the world.

Most of the great wheat lands of the world have an annual rainfall of between 15 and 35 inches, though in Australia the grain can be cultivated with a total of 8 inches a year, providing it is at the right season, by means of dry farming.

Both the character and quality of wheat vary greatly according to climatic conditions. The wheat of warm, dry lands, Mediterranean and monsoon lands is hard; American wheats are usually of a red type, Australian are white. Macaroni, vermicelli and like products are made from hard wheats, while wheats are often blended to give the best flour.

*World Production.*—Fig. 12 shows the principal wheat-growing

countries of the world. It will be observed that all the important areas are outside the Tropics and do not extend nearer the pole than latitude  $60^{\circ}$ . The little diagram, Fig. 13, shows the proportion grown in the principal countries; it may be noticed that more than a third is grown in European countries (not including Russia) while less than a third is in North America, Canada and the United States, about a quarter in Asia including Russia, and only comparatively small quantities in South America, Australia and Africa.

The position is very different if we examine those countries which grow wheat principally for export, and we may distinguish two groups among the wheat-growing countries :

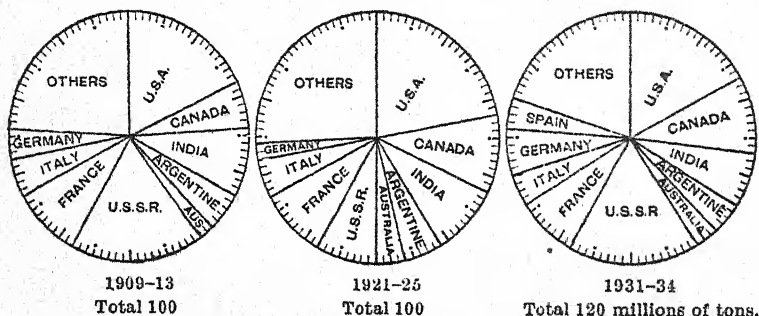


FIG. 13.—The world's wheat production.

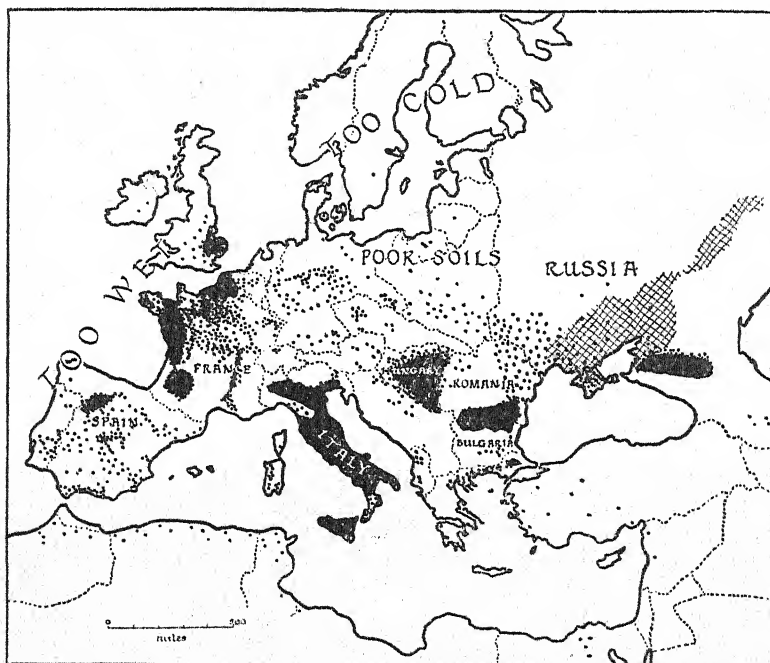
(a) Those which grow wheat mainly for home consumption and which are only just self-supporting or in which the deficiencies in local supply are made up by imports. Most of the European countries (excluding Russia, Hungary, Rumania and Yugoslavia) belong to this group.

(b) Those which grow wheat mainly or largely for export as well as for home consumption. They are mainly "new" countries where the wheat lands are still being extended. Those of importance are Canada, the Argentine, Australia and the United States. Some countries which used to export wheat now require it nearly all for home use; this is notably the case with India, Russia and almost with the United States. Let us examine some of the principal wheat-growing countries. ✕

The countries of Europe (excluding Russia) grow about a

*Difference in the methods of Cultivation = 1.95 (Int. Com. Rep)*

third of the world's total, but consume over half of the world's total. There are large crops in the Mediterranean lands, especially of hard wheat, but the climate is too dry for a high yield per acre: the average in Spain, for example, is about 13 bushels per acre, in Italy about 16. In the countries of North-Western Europe wheat is characteristic of the drier, sunnier side, e.g. the east and south-east of Britain, where the



The cross-hatched area in Southern Russia is the great spring wheat area. Notice that the new boundaries of Czechoslovakia, shown on Fig. 214a, scarcely affect the wheatlands of that country.

rainfall is between 20 inches and 30 inches. France has a larger area under wheat than any other European country except Russia, but again the yield is rather low. Britain, Holland, Belgium and Denmark practise intensive cultivation with manuring and rotation of crops and have very high yields: in Denmark over 40 bushels per acre, in Great Britain about 35, whilst in Germany the yield is about 30 bushels. The Hun-

x In Central Europe (p. 97. Int. Com. Ser.)

Russia.  
(p. 97. 9.c.9)

garian, Rumanian and Bulgarian plains have climatic conditions approaching those of the great grasslands of the world and so produce large crops of first-quality hard wheat. The wheat belt of Russia corresponds with the area of rich black soil, or Chernozem, extending right across the south from the borders of Rumania into southern Siberia. This tract of land produces, or did before the War, one-fifth of the world's total, and in former times when much of the wheat was exported it was shipped from the Black Sea ports. The coldness of the winters over most of this region makes the use of spring wheat general, in contrast to the winter wheat of the remainder of Europe.

In North America, the prairies of Canada and the neighbouring parts of the United States form an enormous wheat belt, but extensive crops are also grown in the Mediterranean lands of California and in the more fertile parts amongst the plateaus of the Rocky Mountains, particularly in the north-western States. It was during the Great War that Canada more than doubled her wheat crop, and she is now the world's largest exporter. The majority of Canadian wheat is spring wheat, for the prairie winter is too severe for winter wheat except in south-west Alberta. Winnipeg is the great collecting centre for the wheat of the prairie provinces. Northwards the wheat belt is limited by cold, south-westwards by the dryness of the climate.

In Asia the large Indian crop is grown mainly on irrigated land, during the winter months, in the Punjab, the North-Western Frontier Province and the United Provinces, but the cultivation and use of the grain is spreading southwards. The Indian wheats are hard wheats and were formerly exported to Britain and Italy, but now the surplus is very small and in some years there is even an import. Both Japan and northern China produce large quantities of wheat, but entirely for home consumption. There has been a great expansion of wheat cultivation in Manchuria.

There is not a large quantity of wheat grown in Africa, though Egypt was the granary of the ancient world, the wheat crop being produced on the fertile Nile alluvium and irrigated land. There are, however, considerable areas under wheat in the Mediterranean lands of Morocco, Algeria and Tunis, whilst small

quantities are grown in the Mediterranean region of South Africa. It is curious that the grasslands of the High Veld of the plateau of Africa have yielded to maize rather than wheat.

In Australia there are two principal wheat belts, both in the temperate portions of the continent. The more important one is in the south-east, stretching from South Australia, through Victoria to New South Wales, lying roughly between the rainfall lines of 10 inches and 30 inches. The other smaller belt is in the Mediterranean region of Western Australia.

In South America the great grain-growing country is the Argentine, and the Argentine is now the second largest exporter of wheat after Canada. Considerable quantities are also grown in Uruguay and in central Chile.

*The Preparation and Transport of Wheat.*—For human consumption the wheat is milled into flour and is also used in the preparation of various sorts of food. There is an increasing tendency for the milling and preparation of wheat products to be carried out in the country of origin; this is notably the

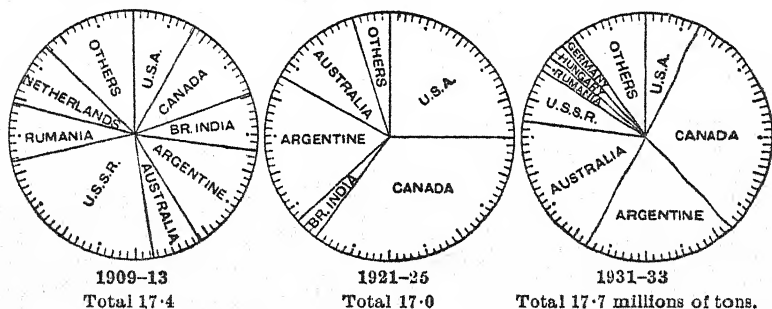


Fig. 15.—Exporters of wheat.

case in Canada. There has also been an important change in the handling of the wheat itself. It was formerly bagged, and exported in that way. The tendency now is to handle it in bulk. The Canadian practice is typical. The wheat is sold by the grower to the company owning or controlling the grain elevators, where huge quantities of wheat are dried and graded ready for distribution or stored if necessary. There are grain elevators beside practically all the little wayside stations in the grain belt; there are huge elevators with a similar function

at terminal points and ports. The graded wheat is poured direct into railway wagons for transport by rail or direct into the holds of steamers for transport by water. On arrival at its destination it is sucked up in much the same way as water is sucked up, indeed the wheat grain can be treated as a fluid.

*World Trade in Wheat.*—The quantity of wheat entering into world trade is something like 20 million tons a year, together with another 4 million tons of flour. The trade is mainly between the four great exporters, Canada, Argentina, the United States and Australia, and those countries of Europe which cannot grow enough for their home requirements, the

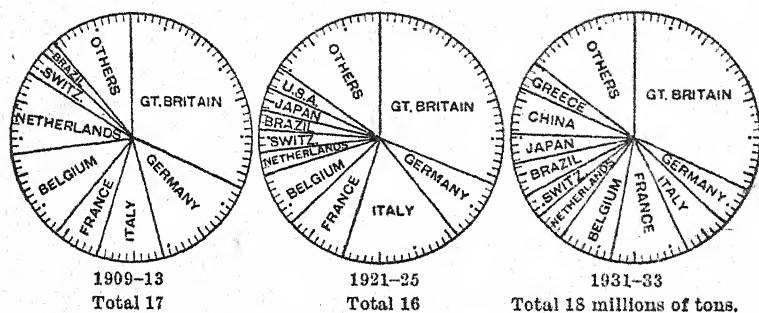


FIG. 16.—Importers of wheat.

United Kingdom, Italy, Germany, France, Belgium, Holland and Switzerland, to which, now, may be added Japan and, as a new importer of considerable significance, Brazil.

**Barley.**—Barley, like wheat, is a cultivated grass. It was the chief food crop of the ancient world and is one of the oldest, if not the oldest, of cultivated grains. But bread made from barley is heavy, and as human food barley has been largely replaced by wheat, though it is still important in Japan, Scandinavia, India and North Africa. One of the chief uses of barley is in the preparation of alcoholic drinks. The grain is allowed to germinate, whereby the starch is largely converted into sugar, and then killed. Beer is an infusion made by fermenting the resulting malt; whisky is made by distillation. Special types of barley are usually grown for malting purposes. Other types are largely used as food for stock.



Conditions of Growth

*Production.*—Barley grows under conditions also suitable for wheat, but in addition it will grow on poorer soil. It is also able to mature very quickly, even at low temperatures, and can thus take advantage of the short northern summers or the brief warm spells of high mountain valleys and is thus cultivated farther north than any other grain—as may be seen in Finland and northern Russia, where it grows well within the Arctic Circle, and is also found higher up on mountain slopes than most grains. It is also able to flourish in hot, arid regions such as Algeria and other parts of North Africa and in most Mediterranean countries. But it is even less tolerant of too much

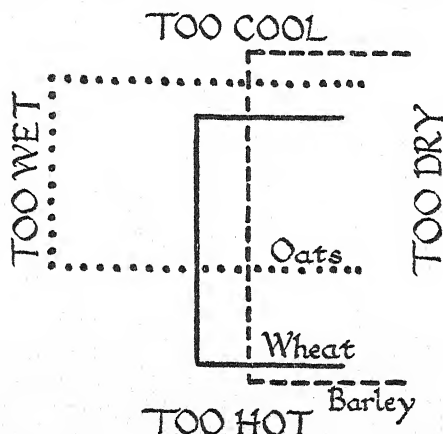


FIG. 17.—The relative distribution of wheat, barley and oats.

moisture than is wheat, and so is not found in the wetter parts of cool, temperate lands such as Britain. Its relationship in distribution to wheat is therefore expressed in diagrammatic form in the accompanying figure.

For malting the barley grown in drier, hotter regions, the so-called "bright" barley, is usually preferred. The regions growing barley are mainly those growing also wheat. Europe normally grows about half of the world's total and the Southern Hemisphere less than 3 per cent. On the whole the yield is larger than the yield for wheat, and this is one of the reasons that made barley popular in Mediterranean regions in olden times.

World  
Production



*World Trade in Barley.*—Before the War the principal exporter of barley was Russia, together with those countries having a mid-latitude grassland climate, such as Rumania and Hungary.

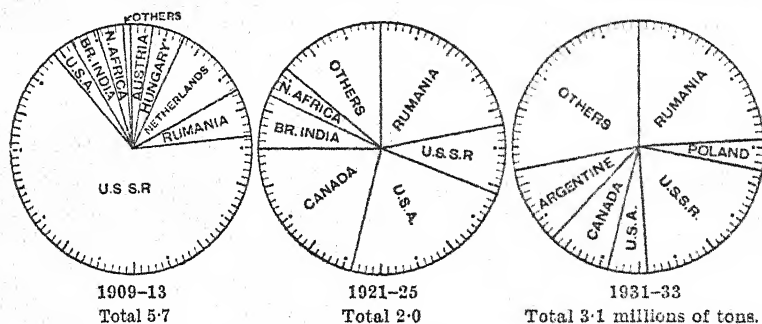


FIG. 18.—Exporters of barley.

The importers were the beer-drinking countries of Europe, particularly Germany and the United Kingdom. A great change took place owing to the upset of world conditions during the War, and the international trade in barley grew very much smaller. Since the War, Canada has taken a leading place with

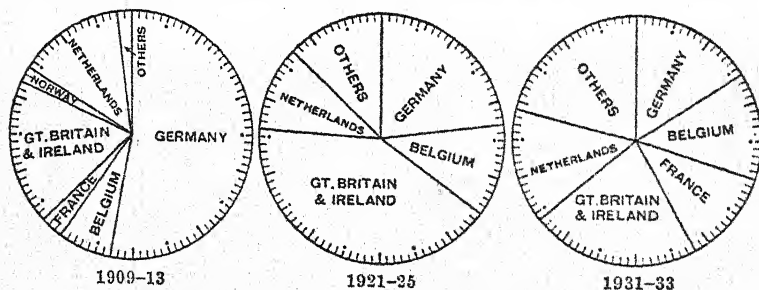


FIG. 19.—Importers of barley.

the United States as exporter and Russia has almost disappeared from the world's exporters; but it is still the beer-drinking countries that are the main importers.

**Oats.**—Although oats form a highly nutritious food, rich in fat and gluten, oats are usually a food for cattle and horses.

Oatcakes made from oatmeal and porridge famous in Scotland and also used in Scandinavia are well known, and various modern breakfast foods use oats as their basis. A bushel of oats weighs considerably less than a bushel of wheat, so that reckoned in bushels oats are in some years the largest of the world's cereal crops. The large quantity grown is not always realised.

*Canadian of fresh* **Production.**—The ideal conditions are similar to those for wheat and barley, but on the whole are damper and cooler. We do not find oats therefore in the warmer regions where wheat and barley are grown, *e.g.* the hotter parts of the Mediterranean lands, and we do not find them in tropical or semi-

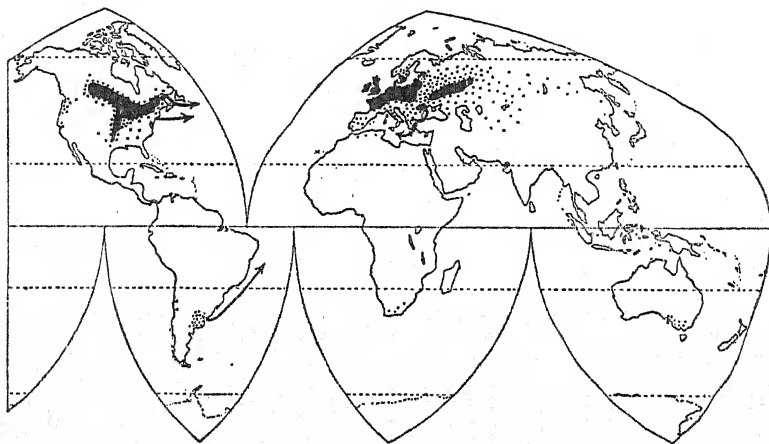


FIG. 20.—The oat-growing countries of the world.

tropical lands such as India and China. On the other hand, oats do not extend quite so far north as barley, but are found in much damper situations, such as the damper parts of the west of England, Wales and Scotland, and in Ireland, and in countries such as Newfoundland with a cool moist climate. An advantage is that oats can be harvested when they are still green. / The map shows the general distribution of oats and emphasises these facts. Notice the complete absence of oats in all countries within the tropics and even near the tropics. Russia is the largest producer and the largest exporter, and

*produces a greater  
of the world's total*

the remainder of Europe grows about 40 per cent. of the total. The crop is extensively grown round the Baltic Sea, since the sandy soils, not good enough for wheat, are all right for oats. Large quantities are grown in such countries as Denmark, Holland, Belgium and Ireland in connection with the dairying industry. Next to Russia the largest single producer is the United States, but none is available for export and there is frequently a small import. Canada is a very important producer, but in the Southern Hemisphere the Argentine is almost the only country.

*World Trade in Oats.*—Even in normal times only about 4 per cent. of the oat crop crosses an international frontier, and in pre-War years nearly half of the export trade was handled by Russia, and nearly all the remainder by Canada, the Argentine and the United States. The leading importer is Great Britain, and the bulk of the remainder goes to those smaller European countries, notably Switzerland, Belgium, Holland, Austria and Denmark, which are concerned with the dairying industry.

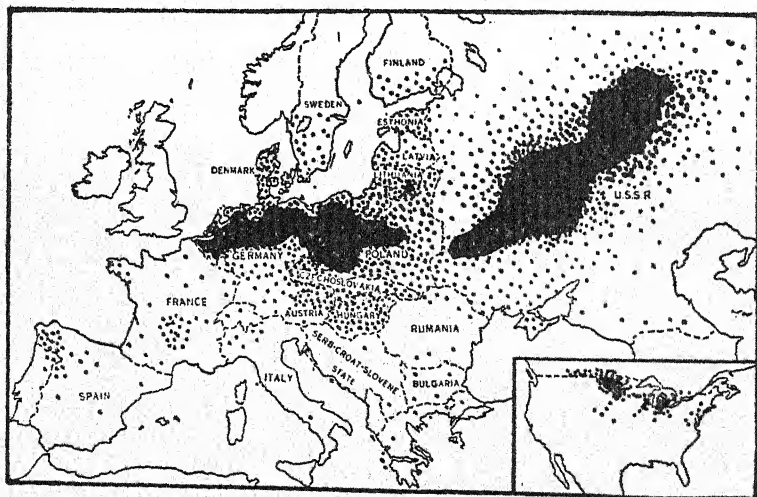


FIG. 21.—The rye-growing countries of Europe.

*closely resembles barley in appearance.*  
**Rye.**—Rye may be described in many ways as the "poor relation" of wheat. Rye bread is the staple food of the peasant population of half Europe—nearly all of that part lying east of

the Rhine and north of the Alpine mountain system, extending from Northern Belgium across Germany and Poland into Russia. Rye bread is very nutritious, but for those who are used to wheaten bread it is somewhat heavy and sour and is quite dark in colour. Several alcoholic liquors are prepared from rye: of these vodka and rye whisky may be specially mentioned.

*Conditions of Growth.*—The conditions of growth for rye are really those for wheat, but it will grow on much poorer soils and in a cooler climate where wheat fails, so this hardy plant is found on marshy and sandy tracts of the great European plain and on comparatively barren uplands such as the Central Plateau of France. <sup>x World</sup> 95 per cent. of the world's rye is grown <sup>Products</sup> and used in Europe and Asiatic Russia; the only other important producers are the United States, Canada and Japan. In the United States and Canada the cultivation has been to some extent influenced by the immigration of peasants from the great rye-growing countries of Europe, and also by the demand for rye whisky. The comparatively small amount of trade is between the countries of northern Europe, but there is quite an important export from the United States.

**Rice.**—We now leave the grains of temperate latitudes for those which are more characteristic of tropical and sub-tropical lands. Rice is another food grain, a cultivated grass once more, and the one which forms the staple food in all the wetter parts of densely populated monsoon Asia, particularly in India, Indo-China, the East Indies, China and Japan, but it is also an important crop in other parts of the tropics and in sub-tropical regions. Even more than is the case with wheat, there are numerous varieties of rice, many of them entirely local in their origin and use. Many inferior varieties are grown owing to the ignorance and conservatism of the native cultivators. Upland or hill rice can be grown on hill slopes, but the bulk of rice grown is lowland or swamp rice, which requires level or flooded fields.

*Conditions of Growth.*—The cultivation of lowland rice necessitates flat fields which can be flooded and which have an impervious layer a short distance below the surface soil so that the water will not readily drain through. In the great rice-growing countries of the East the fields are roughly ploughed, usually by bullock ploughs, under the water and the rice is

sown in small fields called nurseries. For the first few weeks of its existence the young rice grows under standing water. When the tiny plants are standing about 6 inches above the water they are transplanted by hand, in small bundles, as rows in the flooded fields. As the rice grows, less water is required, and so it is allowed gradually to drain off. By the time the grain ripens the fields are dry and reaping is done by hand. Given great heat the ripening is extremely rapid and in some areas as many as five crops in a single year have been obtained. Two crops a year are usual in many parts of the East, but in cooler regions rice forms a summer crop, wheat or another temperate cereal the winter crop. For ripening a brief spell of 80° F., or nearly that temperature, is required, and the July isotherm of 75° F. marks approximately the northern limit in the Northern Hemisphere and the January isotherm of 75° the southern limit in the Southern Hemisphere. The great river deltas and the alluvial plains form the ideal rice lands, for in hilly country the hill slopes have to be carefully terraced before the necessary flat fields are obtained. In hilly districts of such countries as Ceylon and Java there are many amazing examples of hill terracing, with tiny narrow fields only, perhaps, a few feet wide.

Despite the enormous quantities grown it is a mistake to consider either India or China as essentially rice-eating countries; in China it is the essential food in the south and most of the centre, but it is almost unknown in the north. There is no surplus available for export, which is not surprising when one remembers the 400 million people of China. The same is true of India; notwithstanding the large quantity grown there in all the wetter regions, it is a mistake to consider rice the staple food throughout the country. In those regions with a rainfall of less than 40 inches, which is about half the whole of India, it is relatively unimportant and in huge tracts is actually unknown. Nearly the whole of India's rice—about 40 million tons a year—is consumed at home. Although rice is the leading food grain of Japan, it can only be grown in the southern two-thirds of the Empire, and Japan has to import large quantities, including some from Korea. There are three countries, however, in South-Eastern Asia which do produce rice for export; these are Burma, French Indo-China, and Siam, each producing rice

in excess of requirements. On the other hand, Ceylon, Malay and the East Indies do not produce enough and have to import some.

In Europe the only countries where rice is an important crop are Italy and Spain. Italy has extensive rice lands in the valley of the Po, and the cultivation depends largely on the supply of labour and the suitability of the climate. Spain has some rice-fields on the coastal lowlands around Valencia. In Africa, Egypt is an important producer, but it is only recently that the crop has been introduced to some of the suitable climatic regions of the West Coast. In South America rice is grown in

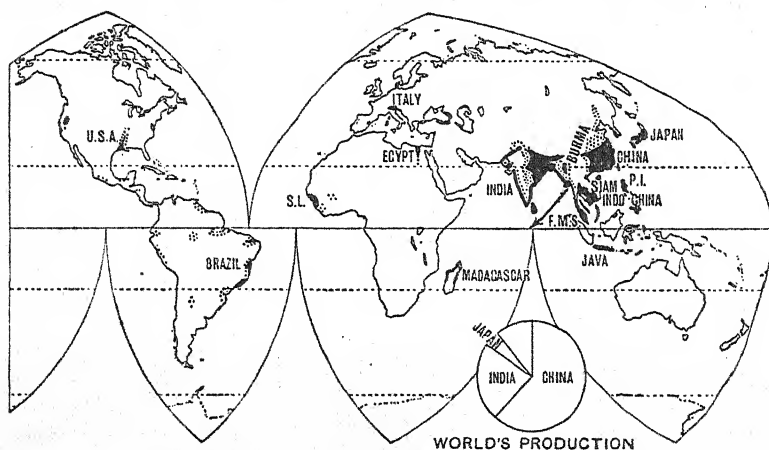


FIG. 22.—The rice-growing countries of the world.

various parts of the coastal tracts of Brazil and Guiana. The cultivation of rice in North America is particularly interesting. In the United States large quantities are grown on the coastal plain of the Gulf States near the delta of the Mississippi and under irrigation in part of the Sacramento valley in California. It has been conclusively proved that the time-honoured, laborious method of planting and transplanting the rice plants is quite unnecessary, and the crop is grown by modern large-scale methods in the United States, with the result that United States rice can be sold more cheaply in Shanghai than can the locally grown Chinese rice. In recent years there has

been an extension in the cultivation of rice in British Guiana, and there are possibilities of expansion in other parts of the world.

*Preparation and Transport of Rice.*—The polished rice so familiar in Europe is never seen in the East, where the rice is merely husked and skinned. There, rice in the husk is known as "paddy," though the reference is usually to paddy fields and to cultivation. The husking and preparation of rice for export is carried out in rice mills, usually at the exporting port, such as Rangoon.

*World Trade in Rice.*—The world trade in rice may be considered to be of two types. There is the semi-local trade between the great rice-eating countries of the Far East, whereby one area with a surplus makes up the deficiencies of another. This trade varies from year to year according to the harvest. The surplus may go sometimes to Ceylon, sometimes to India or China. Only four areas have a regular, large surplus; these are Burma, Siam, French Indo-China and to a smaller degree Korea, which supplies Japan.

In the second place there is trade from the Far East to Europe. Most of the countries in Europe as well as in many other parts of the world import small quantities for food in order to provide the essential rice milk-puddings which figure so constantly on menus in England and elsewhere. The poorer types of rice are imported for industrial purposes, particularly for the manufacture of starch. Just over 6 million tons of rice a year enter into international trade, about a half to two-thirds into the local Asiatic trade only, the remainder being largely imported by Europe.

*Corn or Maize.*—Maize is a native of the New World and was introduced to Europe by Columbus. Its origin is indicated in its common English name, "Indian corn," while the typical American term "corn" indicates its pre-eminent importance in the United States. It differs greatly from the grasses already considered in that it commonly grows to a height of 6 to 12 feet, its stalk being thick and the leaves large. At the top are the feathery male flowers, while the female flowers which later develop into the cob are sheathed lower down between one of the leaves and the stem.

*Conditions of Growth.*—Compared with rice, maize is really a



sub-tropical grain or a grain of the warmer parts of the temperate lands. It requires a good, rich, well-drained, loamy soil, frequent and rather abundant rain or irrigation water during the early growing period, but the soil must never become sodden as in the case of rice. During the life of the plant, which is from  $4\frac{1}{2}$  to 7 months, there must be no great variations in temperature; frost is fatal; the middle portion should be hot both day and night and there must be plenty of sunshine. Thus maize cannot be grown unless half the year is free from frost, nor will it ripen in lands like England, where the summers are

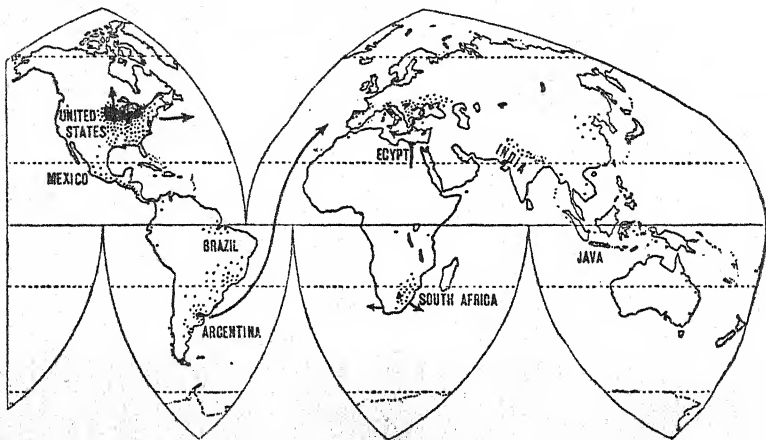


FIG. 23.—Maize-growing countries.

too cool. In favoured localities, of course, good heads may be ripened even in England.

About two-thirds of all the maize grown in the world is grown in the United States, particularly in the south and east and in the famous Corn Belt. It occupies half of all the land devoted to cereals in the United States, that is, twice the area devoted to wheat. Nevertheless the bulk never leaves the farms on which it is grown, being grown essentially for the fattening of pigs and cattle; in other words the maize leaves the farms "on the hoof," only a small proportion being exported. A little maize is grown in Canada, but on the whole that country lies too far north.



In Europe maize is restricted to the warmer and damper parts, particularly in Rumania, Yugoslavia, Hungary and the more suitable parts of Italy, whilst in normal times large quantities are grown in Russia south of the wheat belt; the moister regions of Spain and France are also important. Maize is the great cereal crop over the greater part of Africa, in all the damper and warmer portions. It is the leading crop in the Union of South Africa and in Rhodesia. In Asia it occupies an important but subsidiary place in India and China. Only smaller quantities are grown in India and Australia.

*Preparation and Transport.*—Maize does not make good bread, but in various forms is an important human food in many parts of the world. The corn grains are ground with their skins to form the well-known mealie meal of South Africa, whereas for human food in England the fine white flour made by grind-

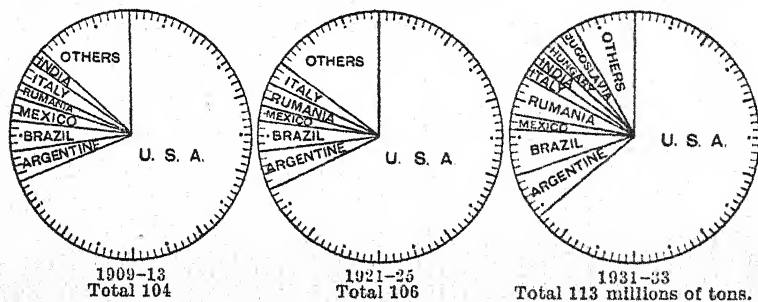


FIG. 24.—World production of maize.

ing the grains, divested of their skins, is known as cornflour. In the United States maize is eaten commonly in the home and the unripe corn is a favourite vegetable. It should be noted that the young juicy plants are also used for cattle food, as well as the ripened grains.

*World Trade in Maize.*—More than half of the maize exported is supplied by the Argentine. Other exporters are the United States, South Africa and the countries of south-eastern Europe, Rumania, Russia, Hungary and Bulgaria. The export is mainly to those countries of north-western Europe which are too cool to cultivate their maize themselves. It is interesting to note the small but significant trade in maize as a vegetable, tinned, or otherwise prepared as a human food.

**Millet.**—Amongst the various small grains which are important as native food in the warmer countries of the world, there must be noted the millets, including three particular types very important in all the drier regions of India; the millet or Guinea corn of so many regions in Africa; the millet, sorghum and kaoliang in northern China and Manchuria and Japan, whilst it is not always realised that there are large acreages occupied by millet in the poorer lands of Europe.

Other foodstuffs which ought to be mentioned here are various members of the pea and bean family, including the all-important soya bean of northern China and Manchuria. Manioc or tapioca is a staple food particularly in Brazil and other parts of South America as well as in parts of Africa. The part of the plant which is used is the underground stem or tuber, and the human food prepared from it reaches Europe as tapioca.

### III. OTHER VEGETABLE FOODSTUFFS

**Sugar.**—Sugar is obtained mainly from two sources. Cane sugar is prepared from the juice of the sugar-cane; beet sugar from the "roots" of the sugar-beet. Sugar-cane is essentially a tropical or sub-tropical plant, but sugar-beet is essentially a temperate plant. The possibility of producing sugar from sugar-beet was only realised towards the end of the eighteenth century, and it was first artificially encouraged in Europe by Napoleon, who thought to break the British monopoly in cane sugar from the British dominions overseas. In the years preceding the Great War, rather under half of all the sugar used in the world was beet sugar, the remainder being cane. Beet sugar was produced in the countries of northern Europe, France, Holland, Belgium, Germany, Poland, Russia, and what was then Austria-Hungary. These are the countries which afterwards were much affected by the War, with the result that during the War years the production of beet sugar dropped enormously and its place was taken by cane, so that when the War was over, more than two-thirds of all the world's sugar was cane sugar, while the rest of the production was from beet. From that time onwards there has been a steady rise in the production of both cane and beet sugar, and the position now is that about two-thirds of the world's sugar is cane and

rather more than a third beet; but it has been rightly said that there would be possibly no beet sugar production if it were not for a system of protection, an artificial stimulus which has been adopted by most of the producing countries.

*Production of Cane Sugar.*—The sugar-cane requires a rich soil and a hot, moist climate and benefits from sea-breezes, so that most of the great cane-growing regions are not far removed from the sea. For the production of this large plant an annual rainfall of 40 inches or more is required, but too much moisture gives a juice poor in sugar. The heavy canes are cut by hand, and the manual work in this hot, humid climate is unsuitable

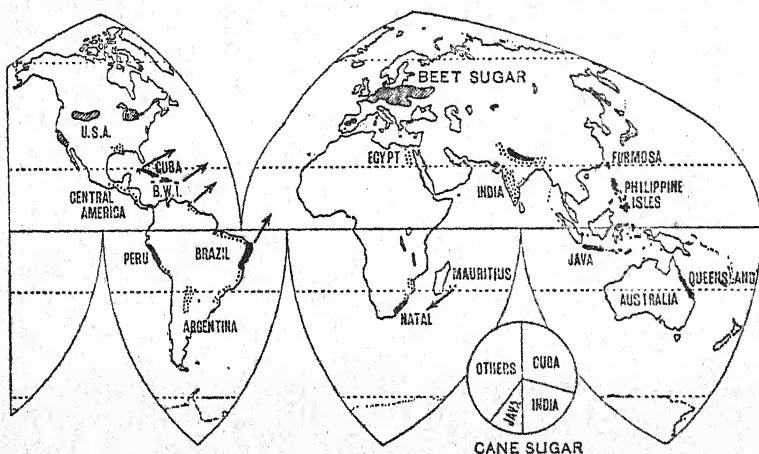


FIG. 25.—Sugar-producing countries.

India is now the world's largest producer.

for white men, with the result that a supply of native labour is essential. The three most important producing countries are India, Cuba and Java. The production of India has increased enormously in recent years. There is great variation from one country to another as to the quantity of cane required to produce one ton of raw sugar; the largest production of cane per acre and the largest production of sugar per ton of cane have been reached in Java; Cuba is second and India a long way behind. In connection with the sugar-producing areas must be mentioned the smaller British West Indian islands which have a large production and depend largely on this commodity for

their prosperity. Louisiana (U.S.A.), coastal tracts of Brazil, and irrigated areas on the coast of Peru are also producers in America. In South Africa, on the east coast of Natal, sugar production has been pushed forward so that South Africa now has more than sufficient for her own needs. Much controversy has ranged round the production of sugar in Queensland (Australia), where there is no native labour but the labourers are in the main immigrants from Southern Europe.

*Preparation of Cane Sugar.*—The stalks of the cane are cut annually, the roots being allowed to give out new shoots for about five years. The cane is crushed by being passed through a succession of rollers, coarse ones at first, and then finer, to squeeze out all the juice. The juice is thickened by boiling, and lime, which combines with the impurities, is added to purify

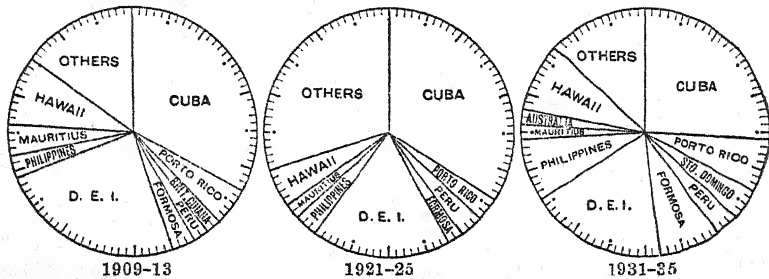


FIG. 26.—Exporters of cane sugar.

the thickened juice. Crystalline raw sugar is allowed to separate out and is a golden brown colour, the residual thick syrup forming "molasses." The sugar is usually exported in these two forms, the refining of the raw sugar being carried out in the country of consumption, treacle and golden syrup being by-products. Molasses enter into various cattle foods, are used for the preparation of spirits (particularly rum), whilst the residue of the canes (megasse or bagasse) after the juice has been crushed out may be used as fuel for the mills and is also available for the preparation of different types of cardboard or board for building purposes.

*Trade in Cane Sugar.*—With the exception of India and the South American republics, nearly all the cane sugar producing areas are small islands which grow the sugar essentially for export. The United States has quite a considerable home pro-

duction in the warmer south, especially the "Sugar Bowl" of Louisiana in the neighbourhood of New Orleans, and there are large supplies in Cuba, Dominica, Porto Rico and Hawaii, countries in which she has political or financial interests. Great Britain gets sugar mainly from the British Empire—her West Indian possessions, British Guiana, and Mauritius—but also largely from Cuba and Java. India uses all her huge home production but no longer imports large quantities from Java.

*Production of Beet Sugar.*—The sugar-beet is an annual plant raised from seed sown in the spring; its whitish, turnip-like roots are ready for digging in the autumn. The roots are washed before being sliced for the expression of the juice. The residue forms a nutritious cattle food. It is an exhausting crop and requires well-drained, fertile, loamy soils, in which there must be a certain proportion of lime. Again there must be adequate moisture during growth, but too much moisture results in the quantity of the sugar being reduced. The large-scale growing of sugar-beet is practically restricted to the countries of Europe and the United States; the leading producers are Germany, Russia, France, Czechoslovakia and Poland, and the United States. Important progress has been made in the last few years in the cultivation of beet in England, so that Britain now produces from a quarter to a third of her requirements of sugar.

*Preparation of Beet Sugar.*—Sugar-beet is a bulky commodity and transport is expensive. The result is that most of the sugar-beet is grown near the factories themselves; a system of contract between the farmers and manufacturers is the usual method of securing an adequate supply. With the exception of Holland (for a limited period) the production of beet sugar has been subsidised in all European countries. The preparation of the sugar from the sugar-beet is comparable with that of cane sugar.

*World Trade in Beet Sugar.*—Before the Great War, Germany, Holland, Austria-Hungary and Denmark were large exporters and supplied Great Britain with nearly two-thirds of her sugar. In 1913 Germany alone supplied nearly half a million tons, more than all the cane sugar used in England. With the development of nationalism in Europe sugar is grown much more for home consumption and the international trade is considerably smaller.

**Cocoa, Coffee and Tea.**—These three great drinks of vegetable origin require different conditions for production. Cocoa is almost essentially a product of the equatorial regions, coffee of tropical or sub-tropical lands, whilst tea can be grown both in the tropics and also in Warm Temperate regions.

*Cocoa or Cacao*<sup>1</sup> is obtained from the seeds or beans of a small evergreen tree. The beans are embedded in a soft white pulp in rows in a large pod which grows, curiously enough, from the stem of the tree. The pods may be of any colour from green to a dark purple, and it requires an expert to know when they are ready for cutting. The large pods are split open on the ground and the beans with their surrounding pulp are scooped out and are placed in "sweating tins," where the soft pulp

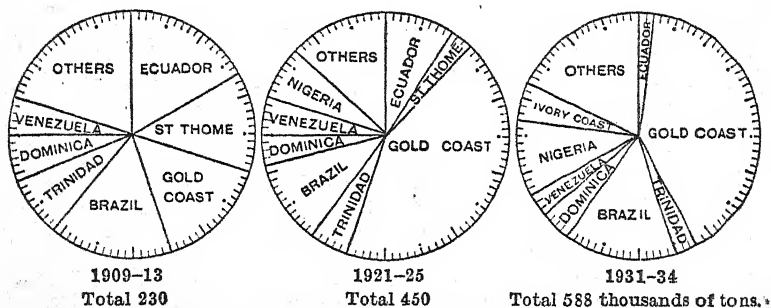


FIG. 27.—Diagram showing cacao-producing countries.

ferments and drains away. The beans are then sun-dried, roasted, and the husk removed. The resulting "cocoa nibs" are ground and some of the fat expressed by pressure before the final grinding. Chocolate is made by adding sugar and retaining some of the excess cocoa butter or fat.

The distribution of the cacao tree is limited to within 20 degrees of the equator and to sheltered lowlands. As the tree develops a long tap-root it requires a deep soil, humid, but well drained. Land cleared of equatorial forest is especially suitable. The climate must be hot, equable and moist with a good well-distributed rainfall. Curiously enough, the trees

<sup>1</sup> "Cacao" is best used for the tree and raw product; cocoa for the finished manufactured material.

when young must be protected from the direct rays of the sun, and so the quickly growing banana palm with its large trees is grown for purposes of shelter. Shelter is also needed from the wind, which would break the heavy seed pods. We may say, therefore, that the natural limits of cocoa cultivation are the limits of the equatorial region, but it is interesting to note that production is by no means found over the whole of that belt.

In the early years of the present century the production was mainly from the small republics of Central and South America together with Brazil, but naturally the crop would grow equally well in other parts of the equatorial region. The stability of government in the British West African possessions proved an attraction to large firms willing to invest the huge sums necessary for plantations and plant. So to-day we find that something like two-thirds of all the world's cocoa comes from the Gold Coast and Nigeria and that the older producers have dropped behind in the race. The leading exporters are now the Gold Coast, Brazil, Nigeria and the Ivory Coast, Dominica, Trinidad and then the West Indian and Central American countries. The largest consumers are the United States, Germany, the United Kingdom, Holland, France and other countries of Europe. The consumption is not so much in the form of cocoa as in chocolate, and there has been an enormous increase in the world demand in the present century.

*Coffee.*—Coffee is obtained by roasting the seeds or beans of the coffee tree. It is a small tree with shining evergreen leaves ; it continues to flower for several months and frequently flowers and fruit are found on the tree at the same time, necessitating two or three gatherings a year. It requires a rich, well-drained soil, preferably cleared forest land, but whereas cocoa cannot stand frost at all, coffee can withstand light frost. Moderate heat and rainfall are required, but an equable temperature is desirable and again protection from the direct rays of the sun. The coffee tree has been found particularly liable to disease, and the once famous coffee plantations of Ceylon and southern India have practically disappeared. There has been much research directed towards the finding of a coffee tree which will resist disease, and one selected stock, now well known, is the "robusta" or Liberian coffee. The bulk of the world's coffee



is produced in Central and South America. It is the leading crop and leading export crop of Brazil, and the rich volcanic soils round São Paulo alone produce half of the world's total. Owing to the coldness of the valleys the coffee plantations are usually on the hillsides, 2,000 feet above sea-level. Coffee is an important crop in other South American countries—Colombia, Venezuela, Ecuador and the Guianas—so that South America is responsible for more than three-quarters of the world's coffee. Some of the Brazilian coffee is rather poor in quality, so that Jamaica and some of the Central American states such as Costa Rica specialise in finer grades.

In Africa small quantities of coffee are grown and Kenya has gained a name for the quality of its coffee. In Asia there is

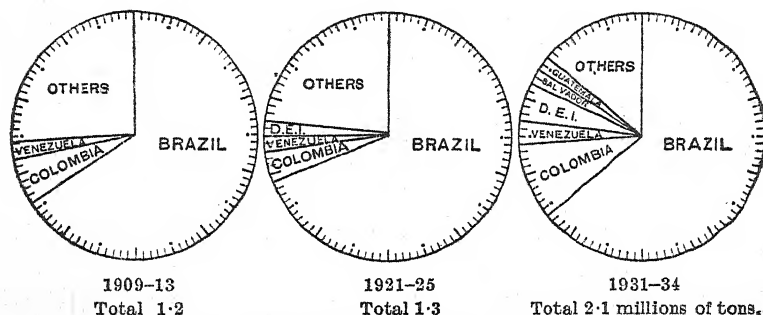


FIG. 28.—Diagram showing the chief producers of coffee.

still a large production from Java, but in India there are only small plantations left, mainly in Mysore. The famous Mocha coffee is grown in small quantities on the seaward slopes of southern Arabia.

The great coffee drinkers of the world are the people in the United States and the people in most countries of continental Europe; in the United States the annual consumption is no less than 12 lbs. per head of population, and in France, Holland, Sweden, Belgium and other European countries it is about the same. Great Britain, on the other hand, uses only  $2\frac{1}{2}$  lbs. per head. Most of the trade is between the South American producers, especially Brazil, and these consumers. Naturally there is a preference for trade between the consumers and their



own colonies: Holland buys from the Dutch East Indies, and so on.

*Tea.*—Tea is obtained by drying the leaves of the small ever-green shrub which is a native of south-eastern Asia. The bulk of the world's tea is still produced from the lands of south-eastern Asia. It is curious that tea-drinking is associated with the English language; the inhabitants of Britain and the Dominions are all large tea drinkers, and the highest consump-

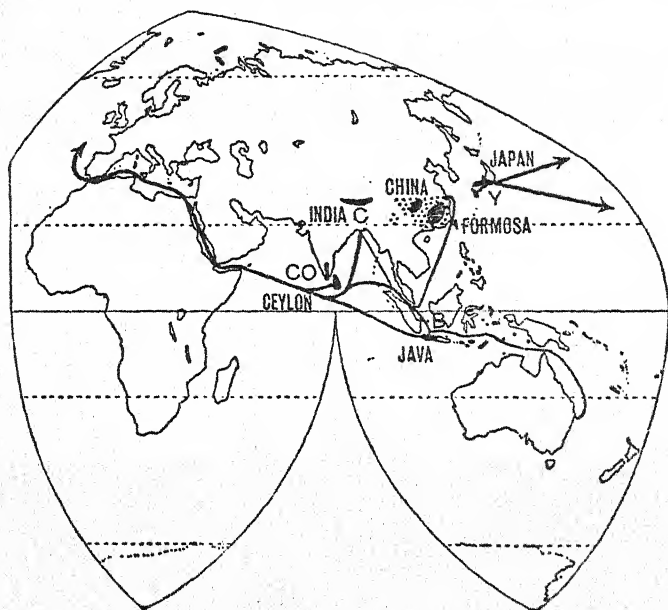


FIG. 29.—Map of tea-growing countries.

Chief exporting ports: CO, Colombo; C, Calcutta; B, Batavia; Y, Yokohama. tion per head in the world is in Australia, South Africa and New Zealand. Though by no means as important as coffee, it is an important drink in the United States and away from regions of the English language, the Dutch, the Russians and the Chinese and Japanese are also tea drinkers.

The tea shrub requires a deep, fertile soil, very well drained, as stagnant water in the soil is particularly harmful, so that hill slopes are particularly favoured, though, if the drainage is good, it grows equally well on valley lands. The shrub, which

would, if allowed, grow to a small tree, can be classed as a sub-tropical plant, but it is very hardy, and provided that the growing season is long, warm and moist, it is not injured by winter frost. It will not, however, grow in countries with a short, cool summer such as the British Isles. The bush is pruned in the spring and shortly after pruning young shoots appear, and when the leaves reach a certain size the leaves are picked. Another crop of leaves, another "flush," occurs later, and others at intervals of a week or ten days during the season. There are three or four pickings in China, as many as sixteen in Assam, and even more in Ceylon. An abundance of native labour is required for the arduous and tedious work of picking the leaves, especially as they must be picked the moment they

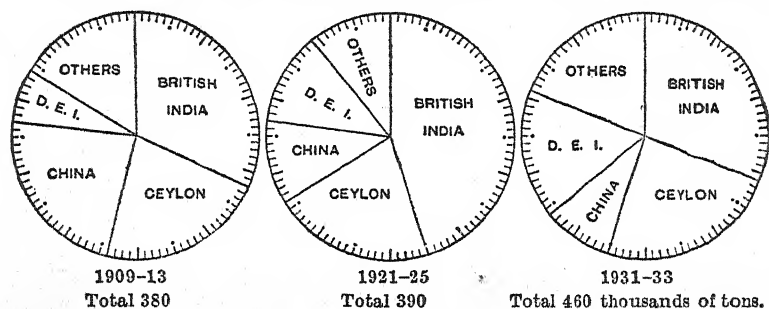


FIG. 30.—Diagram of tea-exporting countries.

are ready, for the various flushes form teas of different quality. After gathering the leaves are withered by being spread out on wire trays and dried, rolled, partly fermented, dried and sifted. Green tea is popular in Japan and the United States, and is merely dried over charcoal fires. There are five great producing areas—China, Assam, Ceylon and Southern India, Java and Japan. All these are densely populated countries with an adequate labour supply. Although tea is grown successfully in Natal, Jamaica, Brazil and California, the production, largely owing to the shortage of labour, remains almost insignificant. Formerly China supplied the bulk of the world's tea, but the place of China in this respect has long been taken by India, where tea is grown in large plantations. Different types of tea can be produced, so that many of the so-called China teas may

actually be grown in India. The failure of coffee planting in Ceylon was largely responsible for the extension of tea planting, but in recent years Java and the Dutch East Indies have been very severe rivals to Ceylon—the second largest tea exporter after India. Tea has long been grown in Japan for home consumption, but the Japanese tea is mainly green tea and so the chief export is to the United States, since it is not popular in Britain. In recent years something like half the tea on the world's markets has been purchased by Great Britain alone, and London is the world's leading tea mart, there being large re-exports from England. In Britain the consumption is about  $6\frac{1}{2}$  lbs. per head per annum.

Mention might be made here of the favourite South American drink—maté, yerba or Paraguay tea. It is made from the leaves of a tree growing in the Paraguayan forest or in cultivated plantations. It is quite different from ordinary tea, and the trade in this commodity is mainly amongst the South American countries.

**Fruits and Wine.**—Within the last twenty-five years great changes have taken place with regard to world production and trade in fruits. Improvements of method in cold storage and transportation and increasing speed of ocean transport have made possible a world-wide trade in fresh fruit which was previously impossible. In addition to this there has been increasing consumption in most of the civilised countries of the world of both fresh fruits and canned fruits. If we examine changes in the food of the British people in the last twenty-five years, we find that the change has been largely in an increased consumption of fruit. We may consider fruit conveniently under four rough divisions:

- (a) Tropical or sub-tropical fruits, including bananas, pine-apples and dates.
- (b) The citrus fruits—oranges, lemons, grapefruits and limes.
- (c) Grapes and wine.
- (d) Deciduous fruits or fruits from trees which lose their leaves in the cold season—apples, pears, almonds, peaches, apricots, nectarines, figs, plums and cherries.

*Tropical and Sub-tropical Fruits.*—Bananas are the fruit of a soft-stemmed plant, 8 to 12 feet high, with very large leaves. They are found in most tropical and sub-tropical countries

where there is a good supply of moisture either from rainfall or through irrigation, but the production of bananas for export requires very careful organisation. Large plantations are prepared within easy reach of the sea-board and a message is sent by wireless when a banana ship is ready for cargo. The bunches are then cut when the fruit is about three-quarters ripe, or a little riper if the distance for transport is short. Within twenty-four hours of their being actually growing the bananas must be stored in the specially constructed chambers of the fruit vessel, where they are kept during the voyage at a temperature of exactly 52° F.; if the temperature goes 2° below or 2° above the whole consignment may be ruined. When the boat reaches port the specially prepared vehicles must be ready if the fruit is to be transported any distance by land, and in the centres of consumption artificial ripening chambers may be required. It is not surprising therefore to find that the banana trade of the world is in the hands of a few large combines, but it is a trade of enormous importance, and bananas may be purchased now in practically every small village throughout the world, at least in all the so-called civilised countries. Among the countries which specialise in this large-scale production the Central American group and the West Indies, led by Jamaica, Costa Rica and Colombia, may be noted, and also the Canary Isles, whilst the Hawaiian Islands send large supplies to the United States.

*Pineapples* are the fruit of a low plant, almost stemless, which sends up long, stiff, sharp-pointed, fleshy leaves, the pine growing in the centre. A native of America, it requires a rich, moist but light and even sandy soil, especially near the sea, and has spread to most of the suitable localities of tropical and sub-tropical lands. Only a few areas, however, specialise in growing the fruit for the overseas market. The trade in canned pineapple is more important than that in the fresh fruit. Europe is supplied largely with tinned fruit from Singapore, Hawaii and California.

*Dates* are essentially the product of the Hot Desert regions, where they form a staple food over large areas. The date-palm flourishes in the oases, wherever a little water is available, right across North Africa, Arabia, Iraq, Iran and India, and has been introduced into California and is grown in the drier parts

of Spain. Large quantities of dates are exported from Iraq, and there are also good quality dates from North Africa, notably Tunis.

*Citrus Fruits.*—As a whole the citrus fruits flourish in the warmer parts of Mediterranean regions, but also in warm temperate and tropical lands.

The orange tree is a small, bushy, evergreen tree with shiny leaves, and is a native of China, but became firmly established in Mediterranean countries in the Middle Ages. Until comparatively recently Spain and Italy had—with the “Jaffas” of Palestine—almost a monopoly of foreign trade in oranges, but there has been an amazing development in cultivation in many parts of the world, particularly in California and Florida, and more recently in South Africa and Australia. Still more recently Brazil and the West Indies have entered the market. Formerly oranges in Britain were associated with the Christmas season and the months which follow, but now they are obtainable all through the year, largely as a result of the difference in seasons in the Southern Hemisphere.

Lemons are not grown so widely and the main European supply comes from Sicily. Grapefruit have only been developed in recent years in the newer countries of the world—Florida, California and South Africa, and more recently in Mediterranean countries, *e.g.* Palestine. Limes require a warmer climate and are characteristically grown in the West Indian islands. It is the export of lime juice which is perhaps more important than the fruit itself.

*Grapes and Wine.*—The grape vine requires essentially a hot dry summer for the ripening of the grapes and so is extensively grown in Mediterranean lands and has now spread to all regions of the world which have a Mediterranean type of climate. Much of the best wine, however, is produced in other lands with hot dry summers (outside regions with a Mediterranean type of climate), notably in Europe, where vine cultivation extends northwards into France, to the Rhine valley in Germany and as far as the Carpathian Mountains in Central Europe.

The vine has a long tap-root which enables it to get water from great depths during summer drought. The two absolutely essential conditions are a long, dry, sunny summer with a mean temperature of at least 60° F. in the last month (*i.e.* the

harvest month) and a rainfall sufficiently light during that season to prevent the juice of the grapes from becoming too watery. Aspect is important, a sunny slope being preferred to the valley bottoms, whilst the character of the soil affects particularly the flavour of the grape and the wine made therefrom. Vine cultivation has practically disappeared from some areas owing to the spread of disease, particularly the much-dreaded "phyloxera." Grapes vary enormously in character and quality. Those grown for export as fresh fruit are very largely from districts which will not produce good wine.

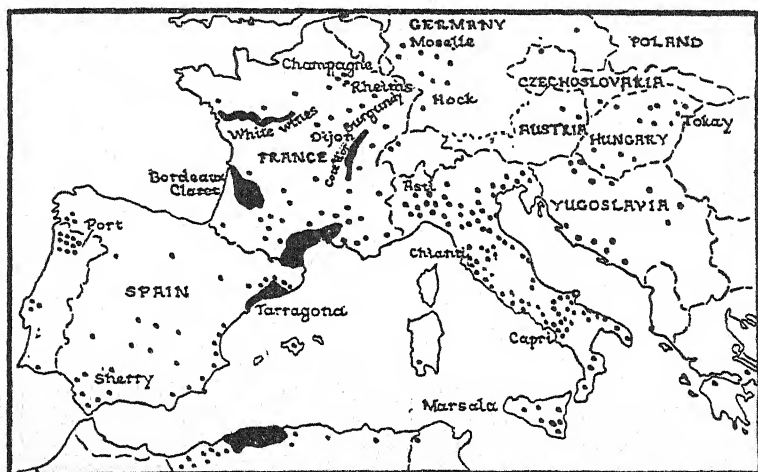


FIG. 31.—Wine lands of Europe.

Curiously enough, grapes ripened under hot-house conditions are some of the finest in quality.

Dried grapes of various kinds form a very important article of international trade. Raisins and muscatels are dried on the vine by partly cutting the stalk of the bunch and are produced chiefly by Spain, California and Asia Minor, though production from the newer countries of South Africa and Australia has increased in recent years. The smaller seedless sultanas come from the Ægean Islands and particularly from Turkey from the port of Ismir or Smyrna, whilst the tiny currants were formerly almost a Greek monopoly, being grown in the neigh-

bourhood of Patras and forming by far the most important export from Greece.

*Wine* may be described as the national drink of France, Spain, Portugal, Switzerland and Italy and of several of the South American countries, and is largely produced elsewhere. It is the fermented juice of grapes. For "sweet" wines the grapes are picked before being fully ripe and fermentation is allowed to go on for only a limited period, so that only part of the sugar is converted into alcohol. "Dry" wines, on the other hand, are fully fermented. The character of a wine is determined in an amazing way by small differences of climate and soil as well as the process of manufacture. As a result the various types of wine are curiously localised; in France, champagne comes from the dry chalk hills of Champagne, near Rheims, Burgundy from the slopes of the Côte d'Or, near Dijon, whilst most of the well-known types of claret are from south-western France near Bordeaux. The sherry of Spain derives its name from Jerez; port is a name which must be applied only to the produce of Portugal from the upper Douro Valley. The white hocks are associated with the Rhine Valley, the Moselles with the valley of that name. The Italian wines are frequently sharper in quality, the best known being chianti. The wines from the newer countries, Australia, South Africa, Argentina and Chile, vary in character and are usually named from their resemblance to the better-known European types. Between 3,000 and 4,000 million gallons of wine are produced annually in the various countries of the world, but the larger proportion is the "*vin ordinaire*"—the regular drink of the peasantry, especially of France. South and central France is the largest wine-producing region, yet there is a huge import of these ordinary wines from North Africa.

*Deciduous Fruits.*<sup>1</sup>—Amongst these are the fruits particularly well known in Mediterranean lands (peaches, apricots, nectarines and figs, together with which may be included the almond valued for its nuts, and the olive<sup>2</sup> for its oily fruit), and those deciduous fruits which are typically found in rather cooler regions, including England. We must remember also the large

<sup>1</sup> Strictly the fruits of deciduous trees, i.e. those that lose their leaves in winter.

<sup>2</sup> The olive tree, with its grey green foliage, is an evergreen.



number of fruits obtained from smaller bushes, collectively known as the small fruits—currants, gooseberries, raspberries, etc. Here again the perfecting of storage and transport has brought supplies of fresh fruit from increasing distances. In England, for example, we now get considerable supplies from South Africa as well as from the countries of southern Europe. Nuts for human consumption include the walnuts and chestnuts from the moister lands bordering Mediterranean countries and the brazils from Brazil.

**Oil-seeds and Vegetable Oils.**—The world trade in various vegetable oils has increased enormously in recent years. They form an important article of human food, mainly through artificial butter or margarine; other types form the basis of soaps, toilet preparations or candles, or enter into industry for various purposes. *Olive oil* is one of the finest, the most expensive and the most important. In southern European countries it largely takes the place of butter or other animal fat in cooking requirements. *Ground-nut oil*, obtained from the underground nuts (known as ground nuts, pea nuts, or monkey nuts), of a plant which is a small annual of the pea family, is to a considerable extent used as a substitute for olive oil. This plant is an extremely important one because it can be grown in a light sandy soil, with a very low rainfall, where no other crop of commercial importance can flourish, and so it has been of great significance in the drier parts of China, India and West Africa. *Palm oil* is a very important product from the fruit of the African oil-palm, growing particularly in the equatorial regions of Africa and recently introduced into the corresponding tracts of South-Eastern Asia, notably in Malaya and Sumatra. It is particularly important in the manufacture of soap and candles and in making margarine, and is the basal raw material of such great industries as those associated with Unilever Ltd. Nigeria easily leads in the export trade. *Coconut oil* is obtained from the coconut, the fruit of the palm which is found particularly on the sandy shores of tropical lands. The dry flesh of the nut is known as copra, and this forms much of the international trade, but there is an increasing tendency, however, to extract the coconut oil by various processes of grinding, heating and pressure in those areas where the coconuts themselves are grown. After the oil has been extracted,



the residue forms "poonac," a valuable cattle feed. Finely dried and grated coconut, known as desiccated coconut, is used in confectionery. The fibre obtained from the outer husk of the coconut is also valuable in the manufacture of matting; it is known as coir. The trade in coconuts and coconut oil is largely between the tropical islands (particularly the Dutch East Indies, Malaya and adjacent islands, Philippine Islands, Pacific Islands, Ceylon, as well as British India), and such of the great consuming countries as the United States, Germany, France,

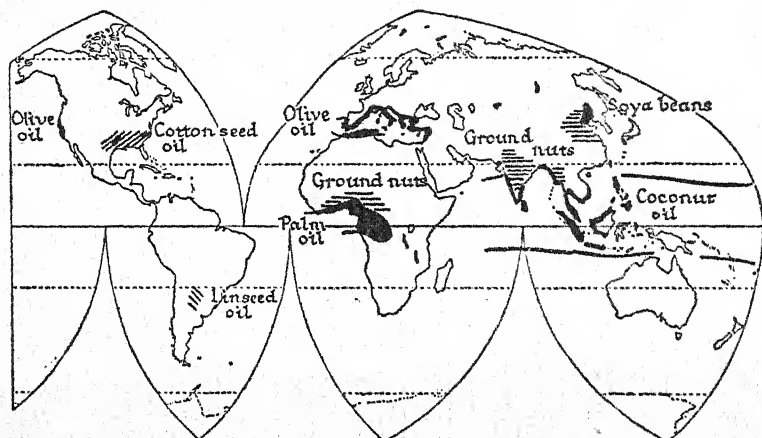


FIG. 32.—Map showing the principal sources of vegetable oils.

Russia and our own country. There are many other important vegetable oils. These include particularly that obtained from *soya beans*, grown and exported in particular from Manchuria to Japan and the United States, but recently being grown in the United States themselves. There is rape-seed oil from India, sesamum oil from India and China as well as linseed from the same plant as yields flax, but grown in tropical countries, particularly northern Argentina and India, and there is cotton-seed oil which is a by-product of the great cotton-growing countries.

**Spices.**—In the Middle Ages spices were of enormous importance ; before means of preserving meat were sufficiently known, meat was very inclined to become “high,” and the poor and often unpleasant flavour was hidden by the addition of spices. Thus many of the early voyages of exploration were virtually in search of spice lands. Many of the spices are equatorial or tropical products. *Pepper* is obtained mainly from Malaya and the East Indies, *ginger* from China, south-eastern Asia and Jamaica, *cloves* from Zanzibar, *cinnamon* from Ceylon, and *vanilla*, a native of Mexico, is now largely produced in Madagascar, Reunion and Java. Though it is scarcely a spice, it is interesting to note here that chewing-gum is made from chicle, the juice of a tree which exudes from it rather as rubber exudes, and which is obtained mainly from the Yucatan peninsula in Mexico.

**Tobacco.**—Tobacco is grown very widely throughout the world, and it is curious that it will flourish both in tropical climates and in quite cold lands. In the majority of countries it is grown primarily for home consumption, as for example in India. The tobacco of international trade comes very largely from the United States, with cigar tobacco from Cuba and special types from the Dutch East Indies, Brazil, Greece and other countries. But the United States supplies about 50 per cent. of all the tobacco entering into international trade.

#### IV. FOODSTUFFS OF ANIMAL ORIGIN ✓

It is curious to note how remarkably dependent for animal foodstuffs man is on a very small number of domesticated animals : cattle, sheep and a very much smaller number of goats, pigs and poultry. The only important source of food of “animal” origin from other than domesticated animals, is the harvest of the sea, fish, and even fish are being bred in large quantities, particularly in the case of salmon.

**Meat—Beef.**—The number and distribution of cattle in the world gives little indication of meat production. In tropical lands, notably India, cattle are kept mainly for draught purposes or for ploughing, whilst the cattle of tropical Africa are very largely regarded by the natives as an indication of wealth

for purposes of currency. In those countries in which mixed farming is the usual rule, of which Great Britain affords a good example, beef and dairy cattle are kept side by side. Broadly speaking, in other temperate lands, beef cattle thrive on wide open grasslands requiring comparatively little attention; dairy cattle, on the other hand, not only require constant attention for milking the cows twice daily, but on the whole need a richer and more carefully regulated diet. The local supply of fresh beef is insufficient for the needs of north-west European countries, especially of Great Britain, and large quantities are imported. Prior to the discovery of the process of freezing or chilling, the international trade was confined to "jerked" or salted beef and to live animals. Of recent years this trade has been almost entirely replaced by that of chilled or frozen meat. Chilled meat is transported in cold-storage chambers kept at a temperature of 30° F.; frozen meat is actually frozen hard at temperatures of 10° F. to 15° F. There is also a considerable trade in tinned or partly cooked meat, including tongues and extracts.

The great mid-latitude grasslands of the world are those largely devoted to beef production, notably in South America, where the River Plate region, with Argentina on the one side and Uruguay on the other, is the chief exporting area. Argentina is the largest exporter of beef in the world and supplies two-thirds of Britain's requirements. The grassland extends into southern Brazil. Another great beef-producing area is the central plain of North America. The animals are reared on the drier western parts of the areas, too dry for agriculture, and are then sent to the Corn Belt and fattened on maize before being slaughtered in the well-known slaughtering and meat-packing works of Chicago. In both North and South America the extension of wheat cultivation and agriculture generally has tended to restrict the cattle lands, and there has been a growth of more intensive cattle farming, the feeding of the cattle on fodder grown for the purpose, and there has also been the development of tropical grasslands, now going ahead in Africa.

Most of these newer lands are populated by breeds which have their origin in Britain or other parts of Europe, and there is still an important export trade from European countries of pedigree bulls and stock for breeding purposes.

**Meat—Mutton.**—As with cattle, sheep may be reared for more than one reason—for wool, for meat, or for milk. Generally speaking, sheep which yield the best meat do not yield the best wool, and vice versa. Mutton sheep, on the whole, are heavy, well-fed animals, thriving in such cool temperate climates as those of the British Isles and New Zealand. No country in the world would seem to be as partial to lamb and mutton as Britain, but in recent years the tendency has been for smaller and younger joints, mainly of lamb rather than of mutton.

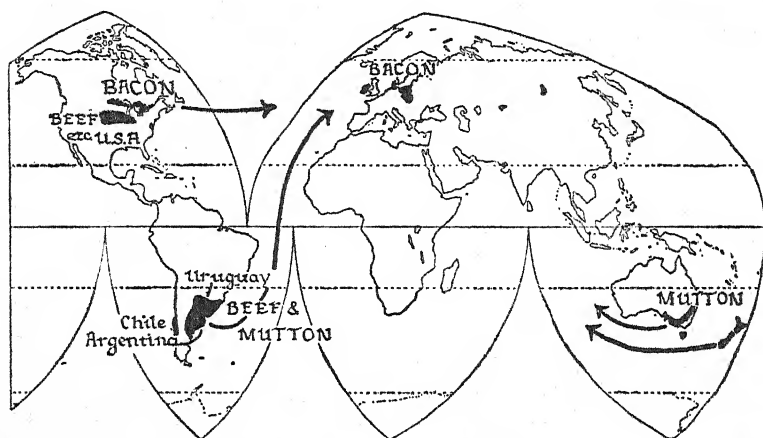


FIG. 33.—Map showing the countries of the world producing meat for export.

It is just the same with beef; the large family of the Victorian era has disappeared, and so has the large joint of beef for Sunday dinner, or the large joint of mutton for the mid-week.

Of mutton and lamb entering into international trade New Zealand supplies more than half; the South American countries, Argentina, Uruguay and Chile taking second place, followed by Australia. Most of the imports are absorbed by Great Britain.

**Meat—Pig Products.**—Pigs can be reared under a great variety of conditions. They are actually extremely clean animals,

though this fact is only gradually being realised even in the great pig-rearing countries of Europe; simply because pigs are omnivorous feeders and will feed largely on waste, they are regarded as dirty by most people or as unclean, particularly by the Mohammedans. They are thus almost absent from Mohammedan countries. On the other hand, fat pork is a favourite food of the Chinese and pigs are abundant throughout China. Apart from this area there are three main regions which rear pigs in quantity: the heart of the United States (the famous Corn Belt), where they are fattened on corn (maize); north-western and central Europe, where the production is directed both towards pork and bacon; and South America—Brazil and Argentina.

Fresh pork is comparatively indigestible when compared with beef and mutton, and so the bulk of the international trade is in the form of bacon and ham. Lard is the fat of pigs melted down, and pigs are especially fattened for a large production of lard in the United States, of which this country is the largest exporter. The largest exporters of bacon are Denmark (which specialises particularly for and supplies the British market), Canada, Poland and Ireland.

**Dairy Produce.**—Under dairy produce we may include milk, butter and cheese. Although in many poorer and tropical countries goat's milk is significant and in some areas sheep's milk, the bulk of the milk used in civilised countries is that of cows. There is an obvious advantage in a supply of fresh milk, and so we find that dairying is an important industry near nearly all large towns. Even in the British Isles one finds that dairying becomes much less important as one goes away from thickly populated centres, owing largely to difficulties of transport. Recently, however, the possibilities of cold storage is making possible a trade in fresh milk and a good deal comes from the continent of Europe to Britain, whilst modern spray-dried milk is said to be indistinguishable from the fresh when reconstructed. Condensed milk can be sent in tins by any ordinary means of transport. Special types of cattle have been perfected for their yield of milk, and amongst the very well known ones is the Jersey breed.

Butter is much more easily transported than is milk, and so it is with butter that New Zealand is able to compete with the

countries of Europe in supplying the market of the United Kingdom. It is interesting that the great dairying countries seem to specialise in one or more products, in milk, or butter or cheese, rather than all three simultaneously. So we find that the great exporters of butter are Denmark, New Zealand and Australia. The United Kingdom is by far the most important importer. Mediterranean countries with their dependence on olive oil are less interested in the butter trade.

Turning to cheese, some cheeses are made from goat's milk and others from sheep's milk. Roquefort, for example, is made from ewe's milk and Gruyère from goat's milk, and the varieties of cheese are almost as numerous as the varieties of wine and almost as varied. Again, cheese is comparatively easily exported, and so we find New Zealand, Holland, Canada and Italy as leading exporters, with the British Isles and the countries of north-western Europe the principal importers.

**Poultry.**—At present the production of poultry is largely a small-scale industry, and local requirements tend to be satisfied locally; there is room for a great expansion and change in the poultry trade.

With regard also to eggs: the world trade in eggs is much larger than is generally believed. Over short distances the eggs are sent fresh, for example, Denmark and Ireland supply Britain with large quantities of fresh eggs, but huge quantities are sent from China, the leading exporter, in some cases extracted from the shell, as whole eggs or as yolks and whites separately, frozen or in tins. Chilling to a temperature of 31° or 32° F. is also used.

**Fish.**—The fish of warm tropical waters are famed for their variety and beauty, but comparatively few are palatable as human food. The result is that the great fisheries of the world are all situated in temperate and frequently in cold temperate waters. The four leading regions are:

- i. The North Pacific coasts of the United States and Canada, famed for salmon, cod, halibut and herring, the catching of the salmon being pursued in the rivers and creeks of Alaska, British Columbia, and the neighbouring parts of the United States. Stupendous numbers are caught annually, and fear for the exhaustion of the

fisheries has caused care to be taken to encourage breeding.

- ii. The North Atlantic coasts of Labrador and Newfoundland, including the Grand Banks, Canada and the New England States of the U.S.A. These fishing regions were probably known to the Norwegians before the discovery of America by Columbus. The principal fish caught now are cod, haddock and herring, but there are important in-shore fisheries for lobsters and for shell-fish.

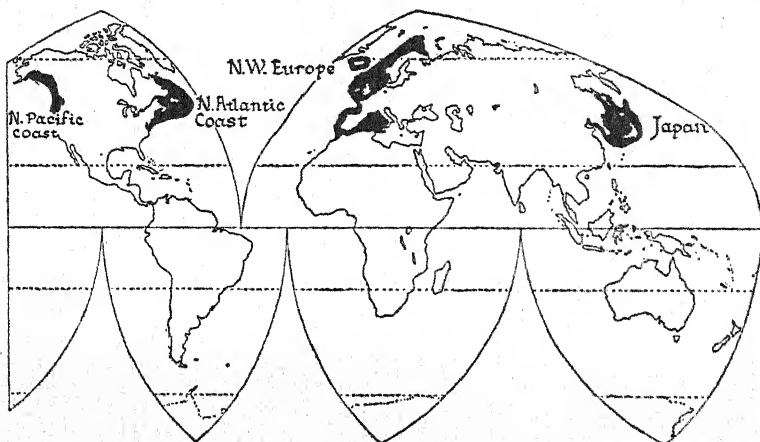


FIG. 34.—Map showing the great fishing grounds of the world.

- iii. The coasts of north-western Europe, extending from the North Cape along the North Sea and round the British Isles to the northern part of Africa. In normal years more than a million tons of fish are landed in Britain alone, the herring taking the first place, followed by cod and haddock. With this area may be included the fisheries round Iceland.
- iv. The coasts of Japan. The Japanese fisheries are of greater value than those of any European country, even including Britain. There are the familiar herring, haddock

and sardine as well as many other food fish which are not found in the other areas.

Amongst the so-called shell-fish oysters are important. They flourish in tidal estuaries, such as the Thames, the Rhine in Europe, but are produced in much larger quantities in America, particularly around the shores of the New England States.

International trade in fish has been expanding in recent years. There is a large trade in tinned or canned fish, particularly salmon, but of recent years the perfecting of methods of transport of fresh fish has been pushed to a very fine art and the trade is likely to be expanded. Dried and cured cod and herrings are exported in very large quantities from the countries of northern Europe to the Roman Catholic regions of the world where the consumption of meat on Fridays is forbidden and fish largely takes its place.

## V. THE RAW MATERIALS OF THE TEXTILE INDUSTRIES

We now turn from foodstuffs to those materials which are used principally for the clothing of mankind. After food and drink the first need of man is clothing; in cooler climates it is essential as a protection against weather, but advancing civilisation has resulted in a considerable increase in the requirements of clothing materials. Apart from a very limited use of skins, leather and rubber, nearly all clothing is made from fibres which are woven into materials and which are of either animal or vegetable origin. In quantity cotton and wool are easily the most important. The following table indicates the production in quantity of the principal materials used :

Raw cotton . . . .	8,800	thousands of metric tons	(1937-38)
Wool . . . . .	1,670	"	"
Flax . . . . .	770	"	"
Silk . . . . .	200	"	"
Artificial silk . . . .	510	"	"
Jute . . . . .	1,575	"	"
Hemp . . . . .	410	"	"

Of these the last two are but little used for clothing.

✓ **Cotton.**—*Production of Raw Cotton.*—Cotton consists of the fibres which clothe the seeds of the cotton plant. When the seed-pod or boll of the plant is ripe it bursts open and exposes



a nest of white material which consists of the seeds and the hairs which clothe them. The first process after the cotton has been gathered is to separate the seeds from the hairs, a process which is known as ginning. Except for the tree cottons of South America, the cotton plant is a small shrub of which several species have been distinguished by botanists. It grows best on rich, light, well-drained soil, but does comparatively well on fairly poor soil. The soil must be capable of retaining moisture, and it is this characteristic which renders the sticky, black, cotton-soil of India and of parts of the American Cotton Belt suitable for cotton. The plant requires plenty of moisture during the growing season, a hot, moderately damp, but not saturated, atmosphere with frequent showers until the flowers are formed, and then a dry sunny period is required until the bolls ripen and burst and the cotton can be gathered. Rains during the picking season damage the lint in the open bolls.

The plant is usually grown as an annual, and the seeds are sown after the last killing frost of spring and the cotton must be gathered before the killing frosts of autumn; 200 frostless days, a little over six months, are the normal requirements. In the United States the cotton is planted earliest in the south, since the spring frosts are over earlier and gradually the planting extends northwards. Cotton is on the whole a dry-zone crop and will not flourish in tropical countries where the rainfall is more than about 40 inches, *e.g.* India, where the native cotton grows with a rainfall of between 20 inches and 40 inches. But in Egypt, Peru and also in parts of India and the United States, cotton is grown on irrigated land. Cotton is thus a crop of tropical climates but not of the equatorial regions, and of the warmer parts of temperate lands. Roughly the potential cotton lands of the world lie between 30° S. and 43° N.

The cotton plant is very liable to diseases and insect pests, the most serious of the latter being the Mexican boll weevil; this entered the United States from Mexico in 1892 and spread year by year until by 1918 it had covered the greater part of the American cotton area. Various methods are required year after year to keep it in check, including poisoning and the growing of early maturing varieties.

Cotton is picked by hand, and so there is a large demand for

hand labour just at the season of the harvest. The average native labourer is capable of picking 100 lbs. of seed cotton per day, but the amount varies greatly for different varieties. The seed cotton is then brought in from the field to the ginneries where the lint or fibre is separated from the seed. The large-scale production of cotton was really only made possible by the invention of the saw-gin in 1793. Previous to that it would have taken months for a man to gin by hand the modern bale of 500 lbs. After ginning, the raw cotton is compressed into

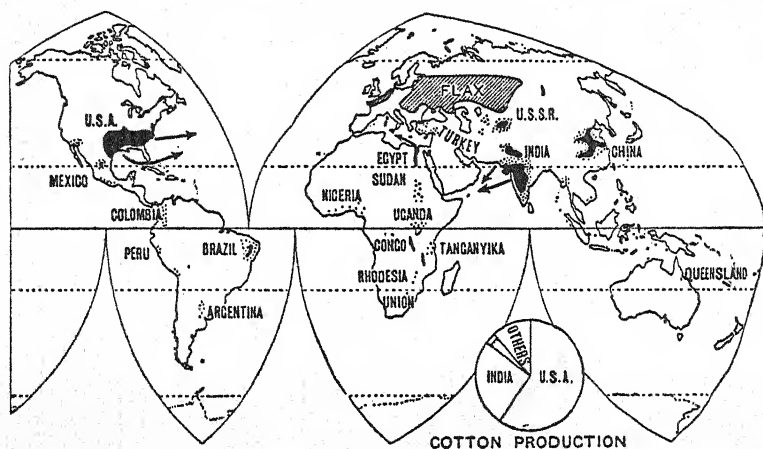


FIG. 35.—The cotton-producing countries of the world.

bales averaging about 500 lbs. each (except in India, where the bales are about 400 lbs. and in Egypt about 750 lbs.). The elastic fibres of cotton are not injured by being compressed into bales, and at this stage the cotton is sent overseas or to its destination for manufacture.

There are many varieties of raw cotton; the little fibres vary in length from  $\frac{1}{2}$  inch to  $2\frac{1}{4}$  inches, and in America and India, when they are less than  $\frac{7}{8}$  inch in length, the cotton is referred to as short-stapled. In Egypt, however, only cotton exceeding  $1\frac{1}{2}$  inches would be regarded as long staple. Commonly raw cotton is distinguished into four grades :

*Grade I* (above  $1\frac{1}{8}$  inches staple). The best of all is the very small crop of Sea Island—a fine silky cotton—grown in the West Indies. Attempts are now being made to revive the growth of this variety in Georgia and Florida, where it was grown in larger quantities till the advent of the boll weevil. The best varieties of Egyptian cotton grown in Egypt and the Sudan and a little in Arizona from seed originally Egyptian also come into this grade.

*Grade II* (above  $1\frac{1}{8}$  inches). The bulk of the Egyptian crop (Uppers) and the Peruvian, also certain Brazilian varieties (North Brazil), East African (Uganda and Tanganyika), and the best varieties of American long staple. A good deal is now grown in Russia.

*Grade III* ( $\frac{3}{4}$  inch to  $1\frac{1}{8}$  inches). The bulk of the world's supplies, including the American crop, most of the Brazilian (Sao Paulo), other South Americans (e.g. the Argentine), the Russian and part of the Chinese, other African crops and about one third of the Indian crop.

*Grade IV* (below  $\frac{3}{4}$  inch). The remainder of the American and Indian crop, and probably the bulk of the Chinese and other Eastern and Near Eastern crops. Many of these are harsh in character as well as short-stapled.

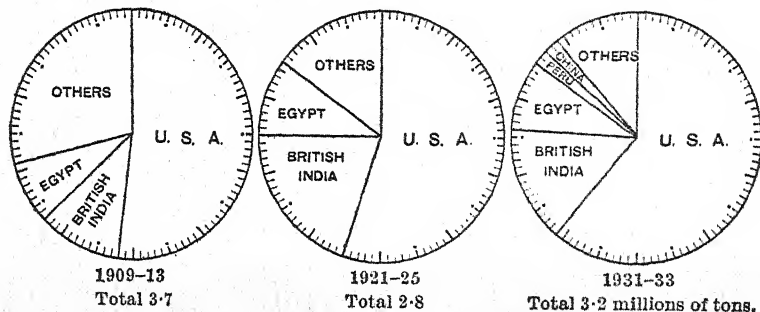


FIG. 36.—Diagram showing the cotton-exporting countries.

Nearly half of all the cotton in the world is produced in the United States, in the great Cotton Belt of the south-east. There is considerable fluctuation in the yield from year to year, which results in great variation in the quantity available in the world. The second country in order of production is India, but much of the Indian cotton is coarse and short stapled, and goes to Japan and continental Europe rather than to Britain. Very fine cotton is produced in Egypt and also in the Sudan, but the available area of the narrow Nile valley in Egypt is small.

The United States is using an increasingly large proportion of her production at home and, as long ago as 1902, British manufacturers combined to encourage the production of cotton in the British Empire. There is now a considerable production

in the Sudan, Uganda, Tanganyika, and Nigeria as well as in Rhodesia and small quantities are grown in Australia.

Much of the cotton in Brazil and Peru (and small quantities elsewhere) is grown on trees, 10 to 15 feet high, which fruit for four years or more. One variety from Peru is interesting because it is a crinkly cotton called rough Peruvian which mixes well with wool.

The recent expansion of the cotton-growing industry in Russia is interesting, because Russia has just a small part of its territory in Asia, mainly in Turkestan, where the climate is suitable for the growth of cotton. It is the plan of the Russians to provide this area with foodstuffs from Siberia and to devote as much land to the growth of cotton as is possible.

*Manufacture.*—When the bales reach the factories there are many processes through which the raw material has to go. One essential process in manufacture is carding; the little fibres are teased out into a soft, untwisted rope or sliver in which all the

hairs are parallel. This process is now performed by toothed bands passing over rollers. In the process of spinning the fibres are twisted into threads, forming yarn. Weaving, the actual making of the cloth, is a distinct process and is often carried out in entirely different areas: Lancashire has its spinning and its weaving towns mainly quite distinct from one another.

The relative importance of the different manufacturing areas is often gauged by quoting the number of spindles for spinning, though the average consumption of raw cotton per spindle varies greatly; the finer the cotton the smaller is the consumption per spindle. In Great Britain the industry is localised in

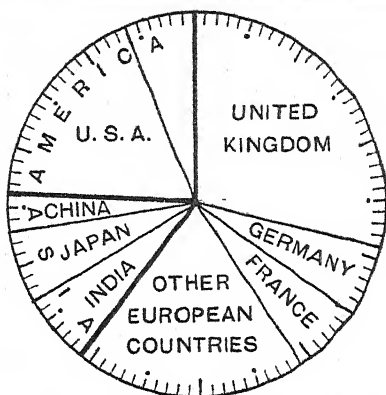


FIG. 37.—Diagram showing the relative importance of cotton-manufacturing countries. Recently the share of the United Kingdom has decreased to 10 per cent.; Asia has risen to over 30 per cent.

south-eastern Lancashire, which has still 25 per cent. of the world's total spindleage and nearly two-thirds of the world's mule spindles necessary for the finer qualities. Liverpool is the seat of the chief cotton market, the Liverpool Cotton Exchange, and Manchester has also a market. In America the cotton towns were originally in the New England states where they used water power, but in recent years there has been a marked tendency for the development of cotton manufacturing in the cotton belt itself. Similarly India is using more and more of the home supply of cotton, especially in Bombay. Of recent years there has been an amazing growth of the industry in Japan, with Osaka as the principal centre. Shanghai and other towns in China also possess important cotton mills. There are important manufacturing areas in France, particularly at Lille, and in Germany on the Ruhr coalfield, and also where electric power is available in Italy and Switzerland.

The world trade in raw cotton is mainly between the tropical or warm temperate countries where it is grown and the densely populated manufacturing countries of Europe or the appropriate parts of the United States, India or Japan. More than half of all the cotton grown enters into channels of international commerce.

**Wool.**—This most important textile material of animal origin is produced mainly by sheep, which are now the most numerous of all domesticated animals. The fibres of wool are covered with little imbricated scales (*i.e.* scales overlapping like the tiles of a roof) and it is these which account for the felting properties of wool; the fibres can be beaten together into a fabric (felt) without weaving. One would think that this might happen on the backs of the sheep, but it is prevented by a coating of grease. Wool is usually transported "in the grease" to prevent felting before manufacture, and after the wool has reached a manufacturing centre the grease has to be removed by a process known as scouring. There is a great difference in the weight of wool before and after the removal of the grease. The fibres of wool are finely curled and a woollen cloth therefore includes a large amount of air space, and for this reason woollen clothes with their large amount of included air are very warm.

✓ **Production of Wool.**—For the production of wool, sheep

require on the whole a cool, dry climate without extreme cold. The temperate grasslands or the mid-latitude grasslands of the Southern Hemisphere are thus particularly suitable, for the grasslands of the Northern Hemisphere suffer from too great a cold in the winter to form ideal sheep lands. It has often been said that sheep must not be kept on damp pastures because they are liable to suffer from diseases such as foot-rot; this is not the case provided the drainage is good, so there are very large numbers of sheep on the hilly pastures of Scotland and Wales and even of western Ireland. In these damper conditions the production of mutton is combined with that of wool, whereas wool sheep will thrive on very poor herbage with a rainfall as low as 10 inches; but in this case their flesh is not of much value as food. Actually wool-bearing sheep may be put into three main groups:

- (a) The original English breeds which have now become widespread in South Africa, Australia and New Zealand and whose wool and meat are of excellent quality.
- (b) Merino sheep, originally natives of North Africa, introduced into Spain and drier parts of Europe in the Middle Ages and later to South America, South Africa, Australia and New Zealand.
- (c) Cross-bred sheep, derived from cross breeding between merinos and the English types. A large proportion of the sheep of Australia and New Zealand are cross bred, and the animals yield both meat and wool.

On all large sheep stations shearing is now carried out by machinery. The yield of wool from one animal varies enormously; the Australian fleece averages  $5\frac{1}{2}$  to 7 lbs., the New Zealand fleece rather more, and a prize fleece may be as much as 30 or 40 lbs. According to the age of the animal several grades of wool may be distinguished:

- (a) Lamb's wool, from 7 months old animals—the finest.
- (b) Hoggetts wool, from 12 to 14 months old sheep.
- (c) Wether wool, from sheep of all other ages. But after the shearing the fleece is usually clipped round or "skirted," the inferior clippings being thrown into a separate bin.
- (d) Double fleece, representing two years' growth, is poorer in quality.

Wool is graded according to the count or number of 560-yard hanks that go to the pound :

- (a) Fine counts have from 60 to 90 hanks to 1 lb. These are chiefly merino wools and are short stapled ( $2\frac{1}{2}$  inches to 6 inches).
- (b) Medium counts from 36 to 60. The long staple wools up to 12 inches include those of English breeds and cross-breeds.
- (c) Coarse or low counts, below 36, which are wools more like hair, from Russia, Asia and North Africa.

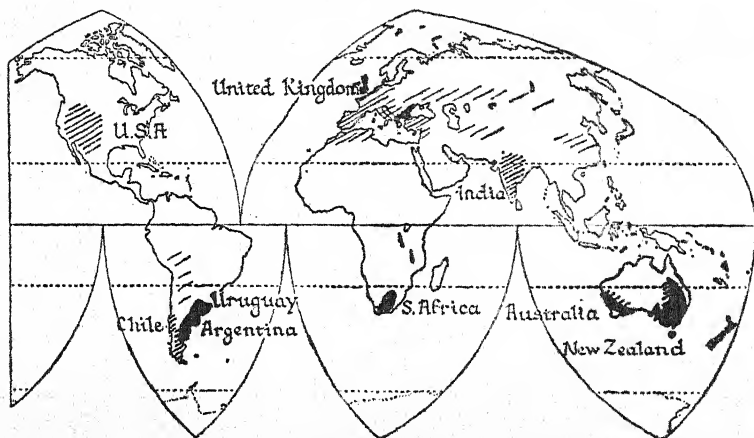


FIG. 38.—Map showing the wool-producing countries of the world.

Wool which is taken chemically from the pelt of dead animals is called slipes.

After the scouring process, when the grease is extracted and, being known as lanoline, is used in the preparation of toilet soaps, the wool goes through the carding or combing process. Formerly it was usual for long-stapled wool to be combed out and then spun into worsted yarn. "Tops" is the technical name for the long hairs, "noils" for the short hairs combed out. On the other hand, short-stapled wools are usually carded (as with cotton) and spun into carded or clothing yarns suitable for milled or fulled cloth ; but according to modern practice some short-stapled wools can be combed out so that combed wools are not necessarily long stapled.



In the weaving of wool two main groups of cloth may be distinguished: worsteds in which the individual threads may be distinguished; woollens in which the surface is milled so that the individual strands are no longer to be distinguished; a blanket or blanket cloth is a good example of the latter.

The grassland regions of the Southern Hemisphere together produce nearly two-thirds of the world's wool; Australia leads, followed closely by New Zealand and the Argentine, and South Africa, and there is an important addition from Uruguay. In the Northern Hemisphere the amount of wool in Russia is large, for home consumption, but the quantity in the United States is smaller. It is often overlooked that there are enormous numbers of sheep still kept in the British Isles, where the sheep population is more important than in most European countries.

In Australia, South Africa and South America the sheep are usually to be found where the rainfall is between 20 and 40 inches a year, though some are kept in drier regions. Surprisingly enough, there are numerous sheep in India and also in China, but Indian and Chinese wools are poor in quality and used mainly as carpet wools.

There are other wools and hairs which, though they include some of the finest textile materials, are usually handled by dealers who specialise in "low wools." *Mohair* is obtained from the hair of a goat and is an important export from South Africa, though formerly Turkey supplied the bulk of the world's mohair. It makes strong, lustrous materials such as plushes. *Cashmere* wool is the fine, downy, winter undercoat of the Kashmir goat—a native of the mountainous regions of the Himalayas of Kashmir, Tibet and southern China, but a fleece from this animal is only about 3 oz. *Camel's hair* is obtained mainly from China and Turkestan.

South America produces several types of wool from animals, native of the high Andes, the *alpaca*, the *llama* and the *vicuña*. The wool of the *vicuña*, a wild animal, is sometimes said to be the finest of all textile materials, but it is only available in very small quantities.

**Silk.**—The so-called silkworm is really the caterpillar stage of several species of moths. When about to become a chrysalis the caterpillar sends out from two minute apertures in its head two strands of jelly-like material which unite and harden on



exposure to the air. The caterpillar completely envelops itself in a cocoon made up of a continuous strand so formed. The female moth normally lays about 500 eggs, which under normal conditions hatch out in the spring and are fed principally on mulberry leaves or sometimes on oak leaves. But in the silk-producing countries of the world incubation is not left to chance ; the eggs are kept for eleven months at an even temperature of 64° F. Formerly the spring crop in Japan suffered from a shortage of mulberry leaves according to season ; now two crops are reared, one in the spring and one in the autumn, and they are of almost equal importance. The consumption of mulberry leaves is enormous ; each pound of eggs requires about 10 tons

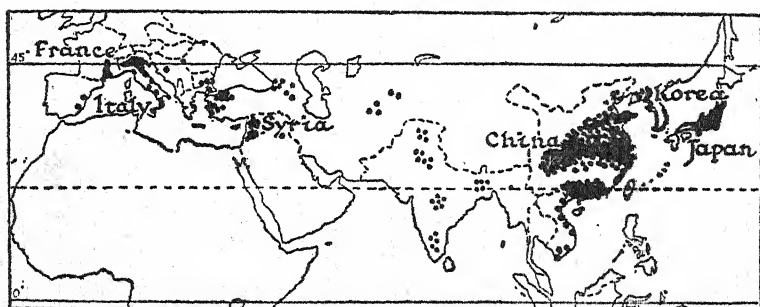


FIG. 39.—The silk-producing countries of the world.

of leaves, and each spring the silkworms of the world will eat about 25 million tons of fresh young mulberry leaves. The rearing of silkworms calls for a great deal of patience, and it is not surprising to find that it is mainly the occupation of women and girls in those countries where silkworm rearing has long been a tradition. The average cocoon measures about an inch in length and yields from 300 to 500 yards of silk thread. The finest cocoons are collected for breeding and the remainder killed by stifling in an oven with a temperature of about 200° F. or by dry steam. The animal is then beaten out in the form of dust and the cocoon is ready for reeling. Silk from an individual cocoon is too fine to be wound off by itself—five to seven are joined together. The yield of silk is only about one-fifth of the weight of the cocoon.

China probably produces about  $2\frac{1}{2}$  times as much silk as the rest of the world put together. The principal silk-rearing areas are in the Yangtse basin and in Shantung, but not a large quantity leaves the country. Quite a large proportion of the silk obtained is from wild moths and is known as wild silk.

From the point of view of commercial production entering into world trade, Japan is the most important country, producing four-fifths or more of all the silk of commerce.

In Italy the most important sericultural centre is in the Lombardy Plain. Some silk manufacture is carried on in Milan, the centre of the Plain, but quantities of raw silk are sent to France, where the Rhone valley is the centre of silk rearing and where there are numerous silk mills at Lyons. The French home supply is further supplemented by imports from Japan, as is also the case with Italy. The diagram shows also countries where only limited quantities of silk are produced. It is interesting to notice that those countries, headed by the United States, which are to the fore in the use of fine silk, do not produce themselves.

Four-fifths of the exports of raw silk are supplied by Japan, Italy and China, whilst the United States, France, Italy and Switzerland are the principal importers.

**Artificial Silk.**—Artificial silk, or rayon, has become enormously important in recent years. Before the War it was

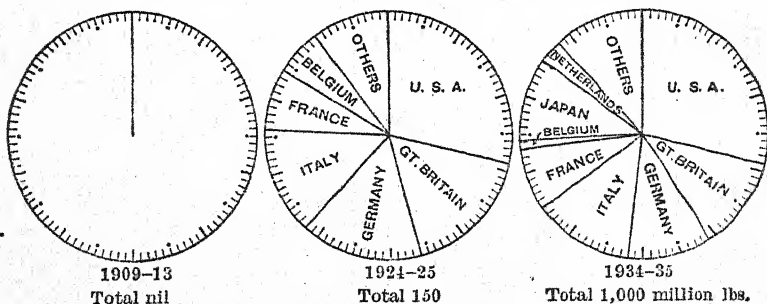


FIG. 40.—Diagram showing the world production of artificial silk.

In 1937 Japan became the world's largest producer.

virtually unknown; at the present day more than 50 per cent. more is produced of artificial silk than of real silk. All types are produced from some form of cellulose, the usual raw materials

being cotton waste, sawdust or wood pulp. The raw material is reduced to a cellulose jelly by chemical means, and is then forced through glass tubes of very small bore. The leading producers are Japan and the United States, but there is close rivalry between England, Germany and Italy for third place.

In the manufacturing areas both the manufacturers of cotton goods and of woollen goods have turned their attention to artificial silk.

**Flax.**—The flax plant can either be grown for seed, as it is mainly when grown in the tropics (linseed, *e.g.* India and northern Argentina), or it can be grown for its fibres, as it is in the cooler parts of temperate lands.

It is a slender plant about 2 feet high with one main stem and small narrow leaves. It requires a well-drained, clean, heavy soil, and is a very exhausting crop. The seeds are planted very closely together, since the closer together the plants can be made to grow the finer the stems and the better the fibre. The harvesting consists of the pulling up of the plants by the roots just before the seeds ripen. The stems are passed through a comb with long teeth to get rid of any seeds which may have formed. The valuable fibres are arranged in bundles around a central, woody core. The outside of the plant consists of soft cellular material. The process of "retting" performed by standing the flax upright in soft water for two weeks or sometimes by the action of dew, or sometimes artificially by steam, is designed to rot the soft tissues and allows the separation of the fibres from the woody core. The latter is broken by the whole being passed through heavy rollers and the fragments are then beaten out; these processes are known as breaking and scutching respectively. The combing of the resulting flax fibres is known as heckling. The fibres are very long, fine and supple, and are made up into 14-lb. bundles for market. There is an amazing variation in yield per acre.

The great flax-growing region of the world is the Northern European plain stretching from northern France through Belgium, Germany and the Baltic States to Russia. Limited quantities are still grown in Northern Ireland, small quantities in northern Italy and a little in Japan and Canada. Something like four-fifths of all the flax of the world is produced in Russia and the neighbouring Baltic States.

Flax is probably the oldest of textile materials ; it is strong and durable and at the same time can be woven very finely so that it is equally valued for handkerchiefs and for sail-cloth.

**Jute.**—Jute is well described as the “brown paper of the whole-sale trade.” It is the cheapest of all fibres, and is used chiefly for the manufacture of wrappings and canvas. It is weaker and less durable than flax and rather easily rotted by water ; it does not bleach but can be easily dyed.

The plant is raised from seed and grows to a height of 10 or 14 feet. It grows best in well-drained soil, but it will grow in muddy swamps. Nine-tenths of all the jute of the world comes from the Ganges delta, where the seeds are sown in March or April and the plant is ready for cutting in August or September. As with flax, the plant has to be retted, after which the fibre is stripped by hand before being washed and dried, sorted and baled.

Originally the preparation was a peasant industry in Bengal and the fibre was used for making clothes, but about a hundred years ago it was used as a substitute for hemp by a Dundee merchant, since which time there has been a great development of the industry.

About half of India's jute is manufactured into canvas or gunny cloth locally, especially in the mill towns north of Calcutta, whilst the other half is exported to Great Britain, where canvas and other jute fabrics are made at Dundee and Barnsley and are exported to the United States or other parts of the world. The bulk handling of grain has made a great difference to the demand for sacks, and consequently to the jute industry. In other trades strong paper has been substituted in many cases for jute sacks, *e.g.* in cement bags.

**Other Fibres.**—Amongst other fibres there are several varieties of *hemp*. The true hemp from Russia and other parts of Europe is largely used in rope making, whilst Manila hemp is a hard-fibred hemp which is also used for making rope and comes mainly from the Philippine Islands, taking its name from Manila, the capital. *Sisal* hemp is another hard fibre, being produced in Mexico, Tanganyika and Kenya.

*New Zealand hemp* or flax can be used for textiles.

*China grass*, which is used for making the so-called “grass

linen," is a very strong fibre, but there is great difficulty in removing the gummy substance. It is widely grown in China.

*Kapok*, from the kapok or cotton tree, is a light and water-proof fibre, but is too short and brittle for weaving. It cannot be baled as cotton is baled, for it does not recover its elasticity after the severe compression.

## VI. OTHER RAW MATERIALS OF VEGETABLE ORIGIN

**Timber.**—The timbers of the world fall into two great groups. Softwoods are derived from coniferous trees and come almost entirely from the great coniferous forests of northern latitudes or from similar forests in mountainous regions. Hardwoods are obtained from the broad-leaved trees and may again be separated into temperate hardwoods and tropical hardwoods. About 80 per cent. of the timber used in the world is softwood, the remaining 20 per cent. being hardwood—18 per cent. from temperate lands and 2 per cent. only from the great stretches of tropical and equatorial forest.

Reference may be made to Fig. 10 to show the principal distribution of the coniferous forests. The largest reserves still remaining are those of northern European Russia and the great stretch across Siberia, much of which, however, is largely inaccessible. The once enormous timber reserves of Canada and the United States are being used up at a very rapid rate. In eastern Canada the lumbering industry centres upon Ottawa, but the extraction of large timber has now given place to the utilisation of smaller trees for the wood-pulp industry, and so the logging industry has gone over to the western side of the continent, particularly to British Columbia, where are found the famous giant Douglas firs and cedars.

The same has happened in the United States, where in New England the original forests have been largely cleared and where also around the Lake States there are not many large trees now left. The Gulf States and warmer parts of the United States are the home of the beautiful pitch pine, but the larger trees have been practically all removed. It is only in the north-western Pacific states (Oregon and Washington) that there are still large reserves of lumber for logging.

Similarly in Europe the larger trees have disappeared from

most of the forests. There is now very little left in Norway and the supplies from Sweden and the Baltic States are limited. By means of scientific forestry, including the planting of enormous areas, France maintains a home supply, and so does Germany and central Europe generally. It is only recently that a move in the same direction has been made in Great Britain, which has the smallest forest-covered area of any European country—less than 5 per cent. of the surface. There is very little softwood in the Southern Hemisphere; New Zealand has limited quantities only of the well-known Kauri and Rimu pines. Plantations of pines have been made in Australia and to some extent also in South Africa, whilst in Southern Brazil and Southern Chile are certain forests yielding softwoods.

Of the temperate hardwoods the oaks are the most important, but there are many others which are used particularly in the manufacture of furniture. Many of the eucalyptus trees of Australia yield excellent timber and the trees are quick growing, and so they have been planted in many parts of the world.

Of the immense number of tropical hardwoods few are really well known. Among the better known, teak comes almost entirely from Burma and Siam, mahoganies from Central America and West Africa. The great difficulty in the exploitation of equatorial forests is the variety of trees and the difficulty of extracting a timber of a particular type.

**Wood pulp.**—Special reference must now be made to the wood pulp and the paper industry.

Paper can be made from a variety of vegetable products reduced to a fine pulp, under water, the pulp being bleached white by chloride of lime. Nearly all paper is now machine made, and nine-tenths is made from wood pulp.

For the large-scale production of paper there must always be a large and continuous supply of softwood timber; spruce is the principal timber used together with various species of fir and pine. Cheap power is essential since a large amount of power is used in the manufacture of paper, and thus it is where cheap hydro-electric power is available that the wood-pulp industry can flourish, as for example in eastern Canada. Then there must be an abundant supply of water and cheap and efficient transport, for the resulting material is bulky and not very valuable for its bulk. So the pulp mills are usually beside

tidal water, and so are the paper mills in importing countries such as Britain.

The United States has the largest consumption per head, and not only consumes the whole home production, but takes four-fifths of all Canada's output. The European countries can barely supply the needs of Europe as a whole. Although the pulp industry uses trees which are too small for the production of timber, the industry forms a very severe drain on the forests of the world. Various substitutes have been tried and can be used; esparto grass from North Africa is an excellent material but is only available in limited quantity. Linen and other rags are used to produce paper, but raw materials other than wood pulp are scarcely available in the quantities necessary.

**Rubber.**—Rubber is obtained from the juice of an equatorial tree, a native of Brazil and known as *Hevea brasiliensis*. There are other trees and shrubs which yield rubber, including the original "India" rubber, but by far the largest proportion of commercial rubber is now obtained from the one tree.

Rubber affords an excellent illustration of the importance of the geographical region. Although the tree is a native of the equatorial forests of the Amazon, under great difficulties it was introduced into Malaya, Ceylon and India, the introduction being carried out *via* London, where seeds were germinated in 1876 and the young plants sent to the Far East. To-day the production of wild rubber from Brazil is no longer important; the bulk is obtained from Malaya, the Dutch East Indies, Ceylon and southern India. The exhaustion of the wild rubber-producing areas is largely due to the terrible "get rich quick" method of the early pioneers, who cut down the trees in their effort to get the rubber.

In plantations a rich, well-drained soil is essential, and they are often made on hill slopes. Plantations require careful weeding and the ground is usually kept clear of vegetation. A heavy rainfall is required, generally between 50 and 200 inches, so that soil erosion has to be watched. A long dry season is extremely harmful, though a short dry season, as in Lower Burma, may allow a short resting period for the tree and may therefore be of advantage.

The milky latex from which rubber is made is contained in the bark of the tree. An oblique slit or series of slits is made



with a sharp knife half-way round the tree, and the latex runs down into a little earthenware or glass cup provided for the purpose. Practice varies, but from the seventh year, when the trees come into bearing, a fresh cut is made usually daily or every other day, early in the morning, and the latex collected an hour or so later. Great skill is required in cutting not to injure the inner, living layers of the trunk. After straining, a

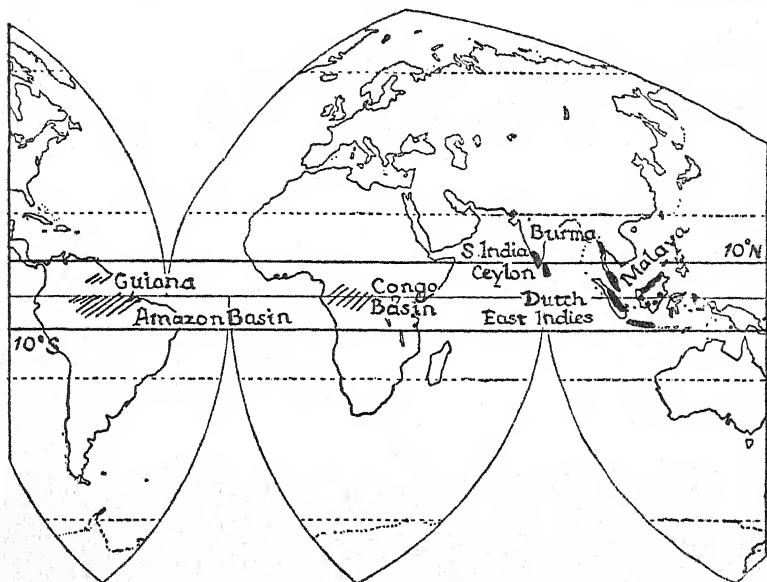


FIG. 41.—Map showing the rubber-producing regions of the world.  
“Wild” rubber areas lined.

small quantity of acetic acid is added to the latex, which after about 12 hours has become curdled and white. It is then passed between rollers to squeeze out the water. The strips are dried, and form crepe rubber, pale yellow in colour, or dried with smoke, forming smoked sheet rubber, dark in colour. It is exported in these forms.

But the real usefulness of rubber dates from the discovery of vulcanisation, whereby the mixing of a small quantity of sulphur with the rubber at high temperatures destroys the stickiness of pure rubber and makes it able to withstand great extremes



of heat and cold. The growth of the motor industry and other users of rubber has meant an enormous expansion in the requirements. But even so the production from new plantations has overstepped the requirements and there has been a corresponding fall in price and a slump in many areas.

Nine-tenths of the world's rubber comes from Malaya, the Dutch East Indies, Ceylon and India, and the trade is mainly from these countries to the United States, the United Kingdom, the countries of Europe, Japan and Russia.

Another type of rubber is "*balata*," which is obtained from wild trees in the forests of South America, particularly in Guiana.

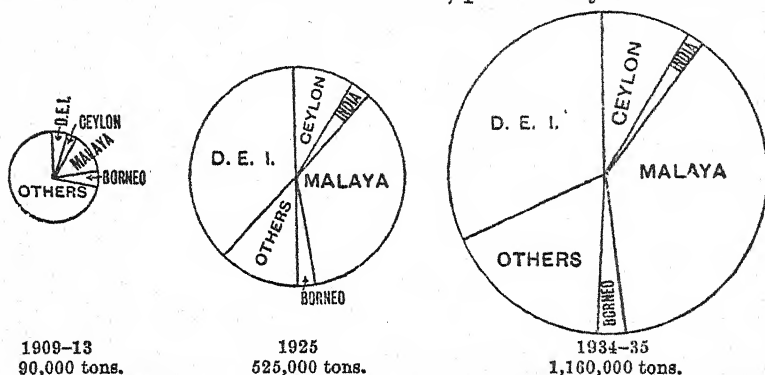


FIG. 42.—Diagram showing the world's rubber production.

**Other Raw Materials.**—Various *Gums* are obtained in much the same way as rubber, and amongst these may be mentioned the important gum arabic from the dry forests or savana lands of the Sudan and other parts of Africa.

*Lac* is a sticky exudation caused by insects on the branches of forest trees in north-eastern India, whence it is exported from Calcutta and has a use in the manufacture of such things as gramophone records.

*Ivory* is a luxury commodity mainly from Central Africa.

Mention should be made of *leather*, which is obtained from the hides of cattle, sheep and goats. The trade is mainly in hides and skins either in a wet condition or roughly dried. The manufacture of leather is carried out in a small number of countries and its character depends very largely on the skill of the tanner. British leathers have a very high reputation.

## CHAPTER V

### Mineral Commodities

The world production of commodities of animal and vegetable origin is determined in the main by factors relating to climate and soil; it is possible to move a plant of economic importance from one part of the world to another. The production of commodities of mineral origin, on the other hand, is determined by quite different causes. In the first place the occurrence of minerals has nothing whatever to do with climate, but depends upon the character of the rocks of the earth's crust. Some people imagine that, just because there are many mining camps in dry or desert regions, there is some connection between the two; this is not the case. What it does indicate is that where minerals occur, man will follow even into the desert. Then in the second place minerals cannot be placed by man where they have not already been placed by nature. There is no question, therefore, of transferring a mineral-winning industry from one part of the world to another.

If we study the production of mineral commodities in one country or in the world as a whole, we shall be struck by the remarkable fluctuation from year to year. There are several reasons for this. When a mineral deposit is worked out it is not renewed and the continuance of supply depends on the discovery of new sources; thus a mine may be opened up and give at first a rich yield, then the ore body may peter out and the mine cease working. There is another reason for these fluctuations, especially in the production of the world as a whole; "man must eat to live" and must clothe himself, but the commodities of mineral origin, though scarcely to be classed as luxuries, are not so vital at all times. Supply and demand tend to fluctuate much more widely than is the case with food-stuffs; in times of prosperity, when active construction is in hand, there may be a very big demand for metals; periods of

depression may result in a virtual cessation of demand and consequently, in the long run, of the supply.

Since the production of minerals of economic importance depends primarily upon the character of the rock, let us examine the different types of rock which go to make up the earth's surface.

**The Origin of Rocks.**—Without entering into the difficult question of the origin of the earth, we may say that, as to-day it is generally agreed, the earth has a solid crust or lithosphere around the central nucleus or barysphere, so called because of its weight, which probably consists almost entirely of pure iron with an admixture of nickel and other metals, and which may be solid or in a plastic condition. When the geologist talks of rock, he has no thought of hardness and a soft clay or sandstone is to the geologist just as much a rock as hard granite.

The crust of the earth or the lithosphere is built up of a variety of rocks, and as we go downwards in the crust, as in a mine, we know that there is a rapid increase in temperature of approximately 1° F. for every 60 feet of descent. It is clear that at no very great depth the heat must be so intense that all rocks would be in a molten condition were it not that they are kept in a solid or plastic condition owing to the pressure of the overlying rocks. From time to time, however, movements in this lower layer of the earth's crust of the molten rock give rise to earthquakes and at times some of the molten material reaches the earth's surface through cracks and fissures, forming the mountains which we know as volcanoes. Not all the molten material which forces its way up actually reaches the surface, and some may solidify very slowly at considerable depths in the earth's crust. But on the surface of the crust itself changes are continually taking place. The heat of the sun, the force of the wind, the falling of the rain, the running of streams, the action of frost, all these are agents which wear away any part of the earth's crust which is exposed above sea-level, whilst on the coasts the sea is hard at work, also doing its share of denudation. Thus the exposed surface is gradually worn down and in time the molten rocks which solidify deep down in the earth's crust may be exposed at the surface. Fragments worn away from the land are carried into lakes or into the open sea, and there they settle in the tranquil, deep waters and form new

deposits. Such deposits are laid down in layers, one above the other, with the oldest at the bottom. They are obviously arranged in "strata" or beds, and they are known as stratified or sedimentary rocks. In them may be entombed the hard parts or other remains of animals or plants living at the time, and it is in sedimentary rocks that we find entombed the fossils or remains of organisms no longer existing on the earth's surface. The geologist has been able to trace out the long, continuous history of the earth by means of these fossil remains. We know too that at times, in addition to small earthquakes, there are great mountain-building movements, often of widespread influence over the earth's surface. We live to-day in a comparatively quiet period of the earth's history, and it was before man appeared on the surface of the earth that the last great

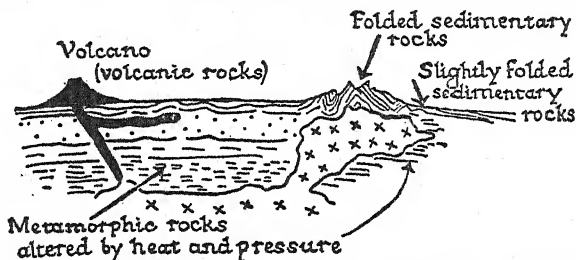


FIG. 43.—Diagram showing the mode of occurrence of the different rocks of the earth's surface.

mountain-building movements took place. This is the Alpine series of movements which built up many of the great mountain chains of to-day—the Alps, the Himalayas, the Rockies and the Andes. Much farther back than that in the earth's history came the great system of mountain-building movements which we call the Armorican or Hercynian and which succeeded the period of the earth's history when many of the great coal seams were formed. Earlier than that was the great Caledonian system of movements which built up mountains which to-day are left to us in such remnants as are to be found in the Highlands of Scotland. Farther back still in the earth's history were other great mountain-building movements.

These mountain-building movements had the effect of folding, bending and crushing the existing rocks of the earth's surface,

and when a portion of the crust has gone through a succession of such movements, the rocks are completely changed from what they were originally. The change has been aided too by the action of molten rock forcing its way up from below; such changed rocks we call "metamorphic" rocks. We may distinguish then four great groups of rock:

- (a) *Sedimentary rocks*, which are deposited in water in layers and which contain remains of animals and plants. Examples are sandstones, sands, clays and shales.
- (b) *Organic rocks*—a smaller group of rocks, consisting almost entirely of remains of animals and plants, usually, too, laid down in water. Coal is a good example and certain limestones also belong to this group.
- (c) *Igneous rocks* (literally "fiery" rocks), which have come up from the lower layers of the earth's crust in a

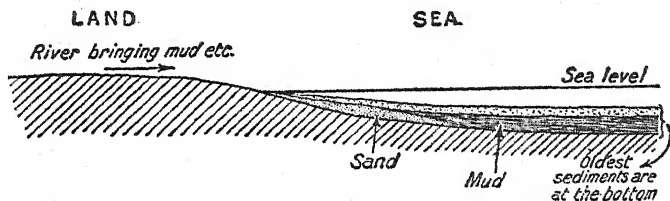


FIG. 44.—Diagram of sedimentation.

molten condition. Those which solidified at the earth's surface, being poured out of volcanoes, are known as volcanic rocks; those which solidified deep down in the earth's surface, but which may later be exposed, are called plutonic rocks, and of these granite is a good example.

- (d) *Metamorphic rocks* are the changed rocks, and the change usually results in an important re-crystallisation, so that both the igneous rocks and the metamorphic rocks are sometimes grouped together as crystalline in that they are practically built up of crystalline minerals.

**Minerals.**—Rocks are usually, though not always, mixtures of different minerals, and the sedimentary rocks consist of many small fragments, often of a variety of minerals. A mineral may be shortly defined as a naturally occurring chemical compound

either constant in its composition or varying within narrow limits. Included thus amongst the minerals are compounds containing the valuable metals required by man. A very large number of these important minerals, those which contain the metals, are found associated with igneous rocks, sometimes with metamorphic rocks. It would seem that the great reservoir of metallic substances is the heavy interior of the earth. Thus we find that the metallic minerals are usually associated with tracts of crystalline rock. Unfortunately for man the metalliferous minerals do not occur in a pure form, but are usually mixed with other substances, other minerals which are not required; that is to say, they occur in "ores" and have to be separated from their ore. A very common mode of occurrence of important metalliferous minerals is in veins; these veins were originally cracks, and it was along these cracks that heated vapours, molten rock, and sometimes extremely hot waters with minerals in solution have found their way from the heated lower layers of the earth's crust towards the surface, but solidified in the cracks on the way. Near the surface the crack or vein may be rich in minerals, but when traced downwards the minerals may alter in character and the valuable ones disappear; on the other hand, in some

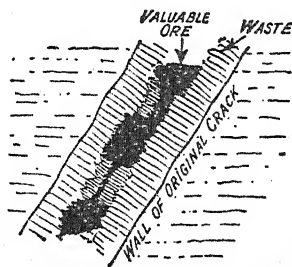


FIG. 45.—A vein.

cases, the vein may become richer as it is traced downwards. This is another reason for the precarious character of mining. It is fortunate for man that the agencies of nature have worn away the earth's crust, for very often in the process of wearing away valuable metalliferous deposits are uncovered. Sometimes, however, the process may go too far and the metalliferous deposits themselves may be worn away. Many of the important minerals are destroyed by this process, but others, which we may call "stable" minerals, are merely broken up into small fragments and their character is not changed.

It so happens, too, that many of the metalliferous minerals are very heavy, and this may even be an advantage to man, because if extremely heavy they will be sorted from

the parent material by the action of water and deposited in thick layers: thus many of the rich tin deposits are found in gravels where the heavy tin ore accumulated together as small grains and can easily be removed by bringing up the gravel and washing away the light material, leaving behind the heavy tin ore. Gold ("placer gold") occurs in the same way. Thus such minerals may be found in sedimentary deposits, but usually not very far from the great areas of crystalline rock.

Of the important minerals which are really organic rocks, coal and oil are overwhelmingly the most important, and we shall refer to these separately in a later chapter.

Let us now examine some of the more important commodities of mineral origin.

**Iron.**—Iron is an extremely common element in the rocks of the earth's crust, in fact there are few rocks which do not contain a certain proportion of iron. Where we see a red sandstone cliff, we may be fairly sure that the red colour is due to an oxide of iron. In a sense, therefore, the whole of the earth's crust may be described as an iron ore, but by no means all the rocks of the earth's surface are important as economic sources of iron. The richest iron ores may contain almost three-quarters of their weight of metallic iron and are, of course, very valuable, but very much poorer ores are important provided that they occur where they are easily reached: thus some of the iron ores of England which are being worked at present contain only 20 per cent. of metallic iron. A useful classification of iron ores is into four chemical groups:

- (a) *The sulphide ores*, including iron pyrites and copper pyrites, of which the former is often more important for its yield of sulphur than of iron, and the latter is important as a source of copper.
- (b) *The iron oxides*, of which hæmatite or red ore ( $\text{Fe}_2\text{O}_3$ ) and magnetite or black ore ( $\text{Fe}_3\text{O}_4$ ) are the chief. This is the purest form of iron and both may occur as large masses associated with igneous or metamorphic rock, or in smaller quantities in veins. The Swedish ores are of these types.
- (c) *Iron carbonates* usually occur in beds mixed with much clay or carbonaceous matter among sedimentary rocks.

The thicker, richer, or more easily worked beds are important.

- (d) *The hydrated oxides*, of which limonite (brown ore) is the chief, occur, like the last group, amongst sedimentary rocks. They have the advantage of occurring in thick beds, rather like coal seams, and if they are near the surface over large tracts of country, as they are in Cleveland (Yorkshire) and part of the Midlands of England, they may be very valuable. Sometimes impurities are difficult to remove from the iron and may ruin the character of the ore. Thus in Great Britain we have to import the pure ore from Sweden for such special manufactures as cutlery, whereas our great ship-building industry has been built up on iron and steel made from local iron ores.

*Preparation of Iron and Steel.*—Iron ore is a heavy and bulky commodity and one which compared with its bulk and weight is not very valuable. Easy means of access and transport are therefore essential; sometimes the smelting is carried out as near as possible to the mines, in other cases the iron is moved as iron ore to a coalfield for smelting.

The poorer ores are subjected to a preliminary roasting to remove certain volatile impurities and the concentrated ore is then mixed with a flux, usually limestone, and fuel—coal or coke—and smelted in a blast furnace. Smelting is usually carried out on the coalfields because of the large quantities of fuel used and the cost of transporting it. It is either a question of taking the coal to the iron ore or the iron ore to the coal, or taking them to some intermediate point convenient for both. Taking examples from Britain, at Chesterfield the iron ore is taken to the coal, in Middlesbrough the iron ore and the coal are both brought and meet there at a point which has very excellent transport facilities. In the blast furnaces the metal sinks and is run off into moulds as “pig-iron,” which may be regarded as the raw metal and is often exported in quantity or moved where the iron is required. Although it contains impurities it may be used direct; articles made from re-smelted pig-iron are known as cast iron, but if the pig-iron is re-smelted and the carbon burnt out by the process known as “puddling,” the iron can be hammered into “blooms” (bars) or rolled into sheets



and is then known as wrought iron. The majority of steels are also made from pig-iron; in the process it is necessary to remove phosphorus which is particularly harmful, whilst manganese is added in the form of ferro-manganese. The conversion of pig-iron into steel is carried out either by what is known as the Bessemer process, or the open-hearth system. Special types of steel are made by adding various other metals in small quantities; nickel, manganese, chromium, tungsten are among the more important metals used in this way.

*The World Production of Iron and Steel.*—Figures of production of iron ore from various countries mean very little because of the immense variation in the proportion of iron per ton of ore. There are many countries which have an important industry in the mining of iron ore, which they supply to the

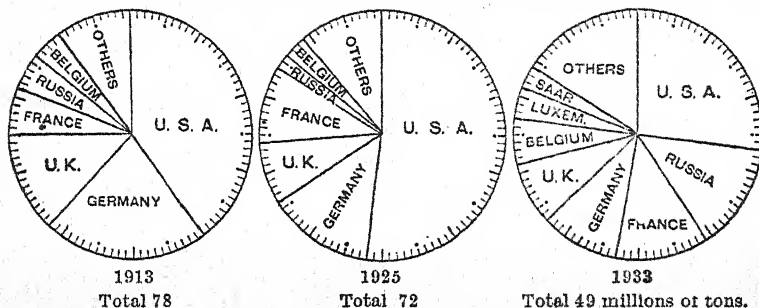


FIG. 46.—Diagram showing the iron-producing countries.

In 1937 the production reached 104,000,000 tons. Japan has recently become important.

great iron-making countries. More than three-quarters of all the pig-iron in the world is made in six countries only. Until the recent slump, more than half of all the pig-iron of the world was made in the United States, where there are huge reserves of hæmetite ore near Lake Superior, and the pig-iron is made either at the lake-side towns to which the ore is brought to meet the coal or on the great Pennsylvanian coalfield near Pittsburg, where the iron ore is brought to the coal.

The other five great iron-producing countries are the United Kingdom, Germany, France, Russia and Belgium. In this country iron ores are widely distributed, but we have not many rich iron ores left. In the Middle Ages iron was smelted in Britain with the help of charcoal, and the iron centres were the

Weald of Kent and other areas where there were abundant forests from which charcoal could be made. Then during the great Industrial Revolution the iron industry shifted to the coalfields and, fortunately, in many of the British coalfields iron ores were also found. But these have long since been exhausted, and to-day our supplies come from three main sources. In the first place there are the low-grade ores from sedimentary rocks of north Yorkshire, Lincolnshire, Northamptonshire and the neighbouring parts of the Midlands. In the second place there is the good quality hæmatite, now very largely being worked out, in Cumberland and north Lancashire; and thirdly there are the huge imports of iron ore, which we get from northern Spain and Algeria, from whence they go to South Wales, and which we also get from Sweden, from whence they go to Middlesbrough.

France has enormous reserves of iron ore in the famous Lorraine fields, also shared by Luxemburg and by Belgium. Germany imports huge quantities from Spain, Sweden and the Lorraine fields. We have in Spain an example of a country which is rich in iron ore but has comparatively little iron industry of her own. The remarkably rich iron ores of Sweden are exported mainly from the ice-free Norwegian port of Narvik. Russia is a country which has both great reserves of iron ore and also of coal. As with many other of the great basic industries, there has been an immense growth in recent years of the development of local iron industries. India is now an important producer of iron and so is Australia. Japan shot to seventh place in 1937.

**Aluminium.**—Aluminium is a very light yet strong metal and has become important in recent years in such industries as the motor industry. Like iron, it is a very common metal in nature and very widely distributed, but is extremely difficult to separate from its ores and there are only certain aluminium ores which can be used, the commonest being that known as bauxite. Indeed, the production of the metal on an economic basis has only been possible since the utilisation of the very great heat of the electric furnace. Thus the prime necessity for the extraction of aluminium is abundant, cheap hydro-electric power. We find therefore that the production of aluminium is virtually restricted to those countries which have water-power resources which have been developed. The leading

producers are the United States, Germany, Norway, France, Switzerland, Canada, Great Britain and Italy. It must be remembered, however, that production in these countries is often controlled by foreign groups, and there are five great national groups of producers: American, German, Swiss, French and British.

**The Precious Metals.**—Under this title we may consider especially gold, platinum and silver. The metal gold is remarkable in several ways: in the first place it usually occurs “native” in nature, *i.e.* as gold; in the second place it is one of the most stable of metals, it does not rust as does iron, nor change to a sulphide as does silver (tarnishing of silver), and the result of these two features is that gold-bearing deposits fall into two broad classes:

- i. The reef or lode deposits, usually associated with igneous rock, and where gold is associated with useless minerals, and so has to be separated, especially by crushing. Gold lodes may frequently be followed to great depths in the earth's crust and afford a continuous mining system for long periods.
- ii. Alluvial or placer deposits, which represent beds laid down by streams coming from gold-bearing country. The native gold has been washed out of the parent rock and, being very heavy, has concentrated in certain parts of those beds, in those parts which the miners call “pay streaks.” The gold occurs either as dust or, sometimes, in larger masses or nuggets. Unless the gold-bearing alluvial deposits are very extensive, these areas are very quickly worked out. On the other hand, it requires little equipment to work a gold deposit of this sort, and a miner with his pan can, quite frequently, gather a rich harvest in a short time. This is one of the great causes of gold rushes in different parts of the world.

The most famous of all the gold deposits, the bankets or reefs of the Witwatersrand in the Transvaal, are really old placer deposits but which have been metamorphosed into hard siliceous masses. The gold is so fine that it cannot be seen with the naked eye, and it has to be removed by chemical means after the banket has been crushed.

*World Production of Gold.*—The gold production of the world remains remarkably constant. There are about 25 million ounces mined every year; expressed in £ sterling the value has increased in the last few years since Britain has gone off the gold standard, and it now exceeds £100 million a year. Approximately half the gold in all the world is obtained annually from the *Witwatersrand* in the Transvaal. Huge reserves of ore still remain, districts farther east are being opened up, and mining is being pushed deeper and deeper in many localities.

Almost another quarter of the world's gold is contributed by Canada and the United States; in both of these countries there have been gold rushes in the past to alluvial gold deposits, but in Canada production now is mainly from lode deposits, par-

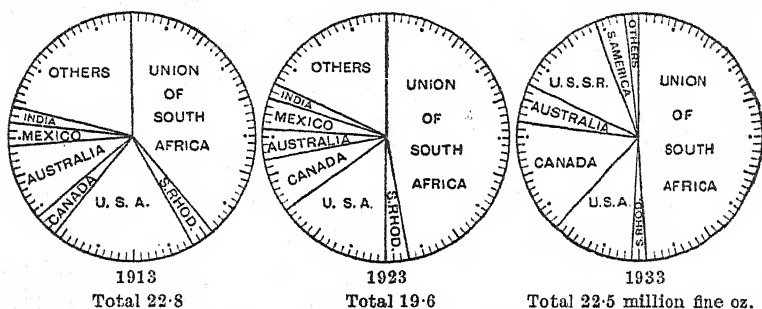


FIG. 47.—Diagram showing the gold-producing countries of the world.

ticularly on that great area of ancient metamorphic rock known as the Canadian Shield. In the United States and Canada gold is widely distributed, through the length of the Rocky Mountains from Alaska to Mexico.

Another important producer is Russia,<sup>1</sup> particularly from the Lena goldfield of Siberia. Australia and New Zealand were once large producers, and it was the lure of gold which took many of the settlers to both those countries. As the placer deposits were worked out, work was concentrated on some of the lode deposits, such as the field of Kalgoorlie, but as these became worked out so the production fell to a very low level; the recent high price of gold, however, in relationship to the

<sup>1</sup> In 1937 the British Empire produced 55.5 per cent. of the world's total of 35.5 million fine oz., but Russia with 6,000,000 was second to South Africa with 11,735,000 oz.

Australian £, has caused a big resuscitation in mining. There is an important production from Rhodesia, a considerable one from the Kolar field in India, whilst many countries in the world, including the Gold Coast, have a considerable output.

*Platinum.*—Platinum is much more restricted in its distribution than is gold. Important producers are Russia, from the Urals, and Rhodesia.

*Silver.*—In many ways silver is a contrast to gold, particularly in the mode of its occurrence. Native silver is not important and the bulk of the world's silver, at least two-thirds, is actually contained as an impurity in lead ores. Thus we find that most countries producing large quantities of lead produce also silver. Of the world's silver production, the leading producer is Mexico,

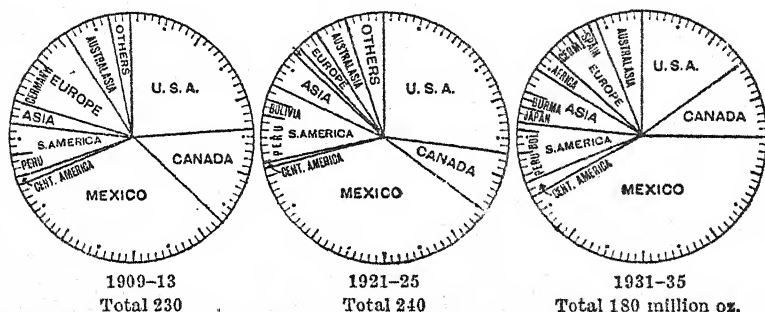


FIG. 48.—Diagram of the world's silver producers.

and this has more than a third of the total. In Mexico the silver ores are not necessarily associated with lead. If we take the North American continent as a whole we find that it produces about two-thirds of the world's silver, the second country in importance being the United States and then Canada, whilst in South America, Peru and Bolivia are important. Australia and Burma are other very significant producers.

Practically all the mines are lode mines, since silver ores are unstable and do not occur as alluvial deposits.

*Lead.*—We take now three important metals which are obtained usually from ores, which are usually associated with great masses of igneous or metamorphic rock. Most of the world's lead is obtained from galena, which is a sulphide, and

it usually contains a small proportion of silver : it is sometimes associated also with some kind of zinc ore, so frequently silver, lead and zinc are obtained from a single mine. About half of the world's lead occurs as veins, the other half occurs as masses of galena, which are chemically replaced limestone, and so is found amongst the older sedimentary rocks which include limestone.

Again we notice the richness of North America, in lead ores as with silver. Half the world's lead comes from the United States, Canada and Mexico ; formerly the United States was easily the largest producer and it is still the biggest producer, but the proportion has dropped lately. Canada's production is largely from British Columbia ; and another big Empire producer is Australia, mainly from Broken Hill, whilst there is a big output from the Bawdwin mines of Burma. Other leading producers are Spain, Germany and Belgium.

**Zinc.**—Since zinc ores are similar in character to lead ores it might be thought that the same countries producing lead would produce zinc : this is largely true, and we notice that the United States is the first producer and Canada is an important one. Again Germany and Belgium must be mentioned, together with France and Poland, whilst again, in the Empire, Australia has a considerable production.

**Copper.**—Copper differs in one respect from lead and silver, in that it is sometimes found native in nature, but not very abundantly, and is more often mined from ores which occur again in veins in igneous and metamorphic rock. The ores of copper are quite widely distributed and quite frequently a green coloration in rocks may be attributed to small quantities of copper. Thus the success of copper-mining enterprises depends on the richness of the deposits and the world price and demand, which are apt to fluctuate very widely from year to year. The importance of copper in the electrical industries places it, however, in the position of a key metal.

Until the recent slump more than half of the world production was from the United States, and something like 70 per cent. of the production was controlled by American interests. But perhaps the richest reserves of the world are those of Central Africa, partly in the southern part of the Belgian Congo and

partly in the neighbouring territory of Rhodesia ; the Katanga area in the Belgian Congo has been worked for some years, but the Northern Rhodesian area is only now being opened up. Canada is yearly becoming increasingly important and replacing in this connection northern Chile. Japan is normally rather poor in mineral reserves, but has a large production of copper.

**Tin.**—Tin is interesting and important in many ways. It also is a “key” metal, and it occurs almost exclusively as the oxide, cassiterite, which is a very heavy and a very stable mineral, so that, like gold, tin ore is usually found in both alluvial deposits (“stream tin”) and in lodes. An interesting point about tin is the remarkable way in which it is concentrated into one part of the surface of the globe, that area being south-eastern Asia. Approximately two-thirds of the world’s tin is produced in Malaya, where it is still largely alluvial tin, the Dutch East Indies, particularly the two tiny islands of Banka and Billiton, quite close to Malaya, together with those parts of Burma, Siam and China which border the same tract. Outside the south-eastern Asiatic region Bolivia is responsible for a quarter of the world’s tin, and the other big producer is Nigeria. A long way behind is Australia, and the once famous deposits of Cornwall in this country are now almost insignificant in their total output. It is noteworthy that the United States does not appear as an important producer, although it is a large consumer.

**Minor Metals.**—Amongst the minor metals are several which are used in the steel industry, for the production of different types of steel, and although only used in small quantities may be extremely important. One of these is *tungsten*. There was a huge demand for tungsten steels during the War and the tungsten mines were very active. The big permanent producer is China, followed by Burma, but when prices necessitate there can be a considerable output from countries like the United States, Malaya and Bolivia.

*Nickel* is used both as a metal for purposes of coinage and also in nickel plating, though nickel plating has given place to other types. Three-quarters of the world’s nickel comes from one district—the Sudbury district of Ontario, Canada ; much

of the remainder from the French island of New Caledonia in the Pacific.

*Chromium* has gone ahead in recent years in connection with new types of stainless steels, and in addition is the basis of certain paints. Rhodesia has shot ahead to the position of premier producer, Yugoslavia to second, and there is also an output from South Africa, India and other countries.

*Manganese* is important in the steel industry: the leading producers are India, Brazil, and the Georgia district of Russia.

**Minerals other than Metals.**—The natural mineral fertilisers were very important before the invention of the artificial fertilisers. The great, naturally-found mineral fertiliser is *sodium nitrate*, which is a very soluble salt, found in huge deposits on or near the surface of the rainless deserts of northern Chile and which formerly constituted the bulk of the exports of that country. It was sent to all those countries practising intensive agriculture, mainly the United States, the countries of northern Europe and Egypt. But this natural production has been affected by a severe slump, partly due to the production of calcium nitrate, an artificial fertiliser made in large quantities in Norway, sulphate of ammonia, similarly made, as well as various potash salts. Natural phosphates are produced in large quantities in Algeria, Tunis, Florida, the Pacific Islands of Nauru and Ocean Island, but phosphates for manure are also made artificially.

**Cement.**—It is not possible here to deal with such mineral commodities, important as they are, as cement, lime, building stone and road metal. To some extent the production is local, but there is big competition in international trade in some of them, especially cement.

**Salt** is another commodity of mineral origin, and may be obtained either as rock salt, as brine from wells or by the evaporation of sea-water.



## CHAPTER VI

### Power

A fundamental requirement of modern life is an adequate supply of fuel, or, more fundamentally, a supply of power. There are three great sources of power at the present day—coal, oil and moving water. In the past wood (together with charcoal) has been an important source of fuel, and it is curious that at the present day the force of the wind is less employed than formerly. In some countries there is a considerable utilisation of industrial alcohol and other industrial fuels, partly also of vegetable origin, such as the industrial alcohol of Germany, derived from potatoes, and the motor spirit of South Africa made from sugar. We will consider in this chapter, however, the distribution and utilisation of the three great fuels—coal, oil and “white coal.”

Coal and oil are both minerals; they both belong to the group of organic rocks mentioned in the last chapter and both occur in sedimentary rocks; they are destroyed by heat and fire, and so are *never* found in those regions of the world where the rocks have been highly altered or metamorphosed, and they are absent, of course, from all igneous rocks. In common with other minerals, they are localised in certain areas of the earth's crust; man has to search for a coal- or an oil-field, but he cannot place one where it has not already been placed by nature. Furthermore the supplies of coal and oil are both exhaustible; they are not replenished as they are utilised, they are won by man on the principle of “robber economy.” In contrast to these two stands water-power, which is inexhaustible, since the supplies of running water are renewed from year to year, and in the long run the most fortunate countries may well be those supplied with sources of water-power rather than of coal or oil. In the future we may be able to harness the tide and derive our water-power from the inexhaustible tidal movement.

In the old days the sources of power were used directly: wood

was burnt, coal was burnt; oil was first used in the same way and water was simply used to turn the water wheel. To-day a great deal of the utilisation of all three is indirect; coal is converted into coke and gas, or is used for the generation of electricity (carbo-electricity). Crude oil is usually pumped great distances, so that the great oilfields have not become industrial centres, and although some of the oil may be used crude, a large proportion of it is refined into its constituent parts producing petrol and various types of heavier oil. The modern use of water-power is almost essentially for the generation of electricity, which when generated at the source of the water-power can be transmitted long distances. Thus the old rule was for settlement and industry to be attracted to the source of the power—hence the great industrial development on our coalfields; the modern tendency is towards decentralisation, the transmission of the power from the source of its origin to any point where it may be required.

**Coal.**—*Formation and Occurrence of Coal.*—Seams of coal represent the remains of vegetation of past ages. We can picture the forest from which the coal has been formed as a huge level swamp with a muddy floor covered perhaps with water. Successive generations of plants, very different from those growing at the present day, but including many that resembled tree ferns, grew, thrived and decayed, and gave rise to a mass of decaying vegetation in the stagnant water. This process of accumulation was terminated by a series of earth movements or earthquakes, and the whole area was overwhelmed by masses of sand or other sediment and so buried. If the coal forests had been growing for a long time the resulting coal seam is thick, and where the disturbances were frequent the coal seams are very thin. It is curious that conditions for the growth of these swamp forests were very widely spread in one period of the earth's history, that period known to geologists as the "Carboniferous," and so very many of the coal-bearing rocks of the continent of Europe were laid down in the Carboniferous period, and in that portion of it which we, in this country, call the Coal Measure period, but there are important coalfields in other parts of the world which are of different ages. As coal was only formed under these certain conditions it is always found in sedimentary rocks, frequently with a layer under the

coal seam of clay, sometimes showing the roots of the old trees, and frequently overlain by sandstone. Where the sandstone overlying the coal seam is hard it forms a good roof and renders mining easy. Of course the coal seams are not to-day found in the horizontal position in which they were laid down; they have been bent and broken as the result of earth-building movements. Some countries are fortunate in that their coal seams have been little disturbed and can be followed over a large stretch of country and are almost horizontal; such is the case in the great Pennsylvanian coalfield of the United States. In other areas, however, the seams have been much folded, broken by great faults so that they can only be followed for short distances and the seams are often steeply inclined; this is true of most of the coalfields of Britain and of much of the continent of Europe; in some places the movement has been so intense that the coal itself has been very largely crushed and its value partly destroyed—many of the Belgian coal seams suffer in this way.

There are many different types of coal, and they are frequently named according to the uses to which they are most suited:

- (a) *Brown coal or lignite* often shows many of the original fragments of wood or leaves of which the parent material consisted. As might be expected, many of the younger coals belong to this group, for the vegetation has not been completely changed into coal. From the economic point of view these lignites frequently contain a large proportion of moisture and after mining may break up into small fragments.

Lignite and brown coals are important in many countries, *e.g.* in Germany and also in Australia, but we must remember that according to German practice 9 tons of lignite are equivalent to 2 tons of good coal.

- (b) *Cannel Coals*, which give a long, smoky flame like that of a candle, form a small, curious class.
- (c) *Humic or Bituminous Coals* include the ordinary house and steam coals. Those which readily form coke are called coking coals, those which are most suitable for raising steam are known as steam coals, whilst the hard coals are those which do not break up easily in transport.

and are suitable for the bunkering of steamers and for export. On the other hand, in a country such as England, where we still use coal in open grates, we like a soft coal which gives out a bright flame for this purpose, and such coal is called household coal.

- (d) *Anthracite* is a very hard, bright coal which does not readily ignite. It contains only a small proportion of volatile matter, but once it is alight, however, it gives out a very intense heat.

The principal coal resources of the world have been calculated and their distribution has been shown in the accompanying diagram. North America (the United States and Canada) has half of all the coal known to exist in the world, whilst Asia, mainly in Siberia and China, has about one-quarter, much more than the total reserves of the whole of Europe.

*The World's Coalfields.*—Every year about 1,500 million tons of coal are raised in all parts of the world; the total is rather less in periods of great depression such as that through which the world has been passing. One-third of all this coal is mined in the United States, one-sixth in the United Kingdom, and one-sixth in Germany; these three countries between them raise two-thirds of all the coal in the world, leaving only one-third for all the other countries put together. But the share of the "other producers" is steadily increasing.

Look at the map showing the coalfields of the United States and notice the huge field which occurs in the eastern part of the continent, the Appalachian field. This is really one continuous field, but is only worked in certain parts. If we take the parts together, this area produces nearly three-quarters of the coal of the United States. The United States has not, however, a

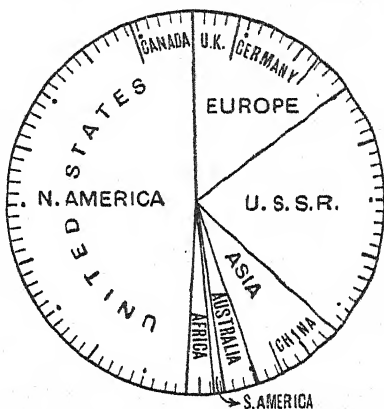


FIG. 49.—The coal reserves of the world.

large coalfield anywhere near the coast, and so we find that the United States fields are not well situated for the export of coal. The next diagram shows the coalfields in Europe, and it will be seen that the greater number of them are in a belt from Britain through northern France, Belgium, Holland, through Germany to the corner of Germany and Poland, and so into Russia. The southern countries of Europe have few or no coalfields. A great

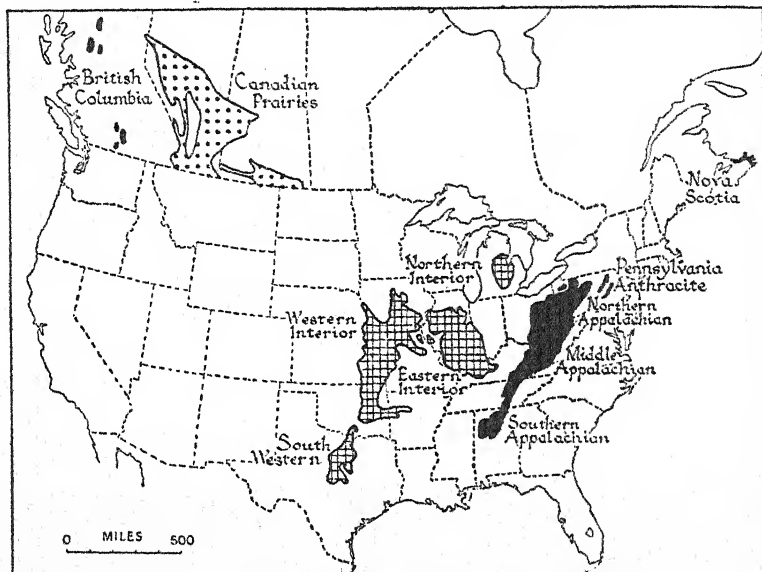


FIG. 50.—The coalfields of North America.

Black, the most important fields at present worked; cross-ruled, important fields partly worked; dots, important fields of semi-bituminous coal in Canada.

difference between European and American coalfields should be noted, namely, that the European fields occur in comparatively small basins. A diagram is given which shows the relative importance in production of coal of the countries of Europe, and we may note here the character of the more important fields.

- i. The coalfield of northern France and Belgium is a long, narrow field which stretches from the Straits of Dover to the borders of Germany. It is the leading coalfield of France, and has resulted in the great industrial

development of France and Belgium, though much of the coal is of very poor character.

- ii. The Campine coalfield of Northern Belgium and Holland is a comparatively recent discovery and has given Holland resources in coal.
- iii. The Ruhr coalfield is the great coalfield of modern Germany. It lies in the Ruhr valley, a tributary of the Rhine, and has become the leading industrial region of Germany.

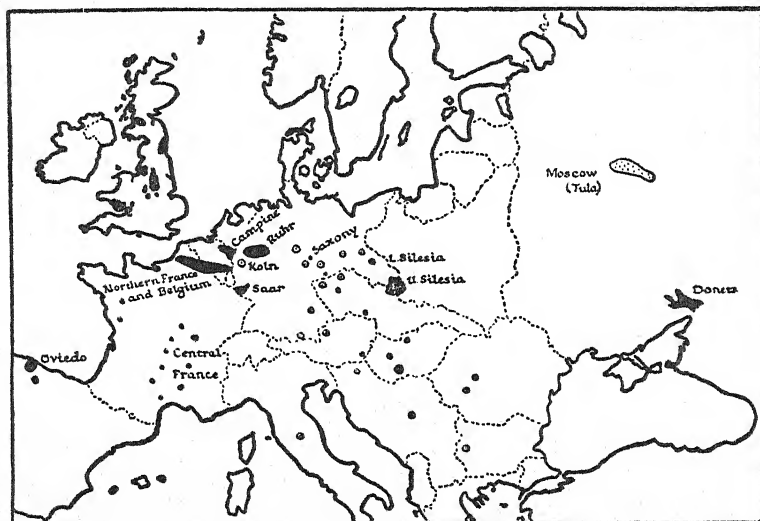


FIG. 51.—The coalfields of Europe.

Lignite and brown-coal fields dotted. For the relation of coalfields to the new boundaries of Czechoslovakia, see Fig. 214a.

- iv. The Saar basin on the borders of France and Germany as a result of the 1935 plebiscite was restored to the latter country after having been controlled by the League of Nations and worked by France.
- v. The Upper Silesian coalfield is partly in Poland and partly in Germany, and to a small extent in Czechoslovakia as the result of the partition after the Great War. Much of the Czech portion passed to Poland in 1938.
- vi. The Donetz Basin and the Moscow field are the leading fields of European Russia.

vii. Smaller fields in Europe are those of the Central Plateau of France and those of northern Spain.

In Asia Japan has several small but important fields, notably in the extreme north and the extreme south, but there is not enough for Japan's own requirements, hence the importance of the resources in Manchuria. Some of the coalfields of China are of enormous extent, probably some of the largest untouched fields in the world; particularly large is the one of Shansi and Shensi in the north, near the Great Wall, which may rival in size the Pennsylvanian coalfield of the United States. India, particularly in the Raniganj field about 120 miles from Calcutta, has important reserves. The other fields of Asia except those of Siberia are usually small and the coals often poor in quality.

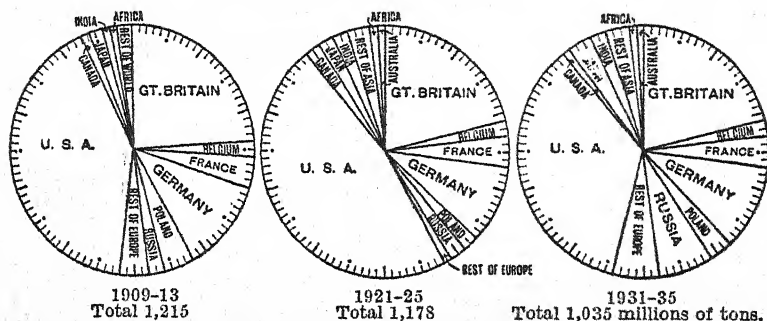


FIG. 52.—The world production of coal.

Australia has several fields, by far the most important being the great basin underlying Sydney. In Victoria a lignite deposit is worked for the generation of electricity for Melbourne and neighbouring towns. New Zealand has two small fields on the western side of the South Island.

South America is very curiously deficient in coal; there is only one area with a small output, in the southern half of Chile.

In Africa the Union of South Africa has extensive deposits, not very far from the great gold-mining region, and it is the supply of cheap coal which has made possible the development of that goldfield. There are fields also in Rhodesia, but it was thought until recently that there was very little coal in the rest of Africa. West Africa is now known, however, to possess considerable deposits in Nigeria.

Coal is known to occur in the Antarctic continent, but it is doubtful whether it will ever be worked. Similarly in the Northern Hemisphere there is coal in the Arctic island of Spitzbergen.

*Utilisation and Trade in Coal.*—The diagrams below illustrate the remarkable difference in the uses of coal in the United States and the United Kingdom. Before the war one-third of Britain's coal was mined for export or for use as bunker coal by ships. With the growth of nationalism and the development of small home fields, and an increasing use of hydro-electric power, Britain's customers for coal have all been buying less, and this is one major reason for the depression in our coal industry.

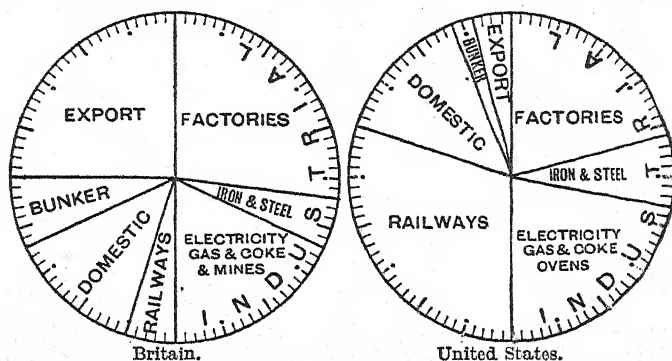


FIG. 53.—The uses of coal in Britain and the United States compared.

The other major reason is the decreased demand for coal for shipping, for bunker purposes. It is difficult to see how either of these markets can be recovered; particularly unfortunate is South Wales, which produces the fine, hard steam coal formerly much valued by steamers for bunker purposes.

*Oil.*—Mineral Oil or Petroleum is, like coal, found in sedimentary rocks, particularly in the younger sedimentary rocks. It is derived from the chemical alteration of vegetable, or sometimes animal, matter, entombed in masses of sand, between beds of impervious clay or shale. The conversion of the mother substance into oil has taken place as the result of the action of bacteria, and it is usually where the deposits were laid down in brackish water that the change



seems to have been possible. So oil is largely found in old delta deposits in many parts of the world. Just as in the case of coal, the beds of sand and clay have been folded by earthquake movements, and in the case of oil this is extremely fortunate, because the sands which contain oil also contain water. Oil is lighter than water and separates out and floats on the water, and as a result rises to the crests of the arches or anticlines. Frequently there is gas too in the sand, which in its turn separates and rises above the oil. The work of the oil geologist is to locate not only oil-bearing beds, but particularly these arches in the strata under which the oil may have accumulated in quantity. It is easy to see from the diagram that wells drilled outside the

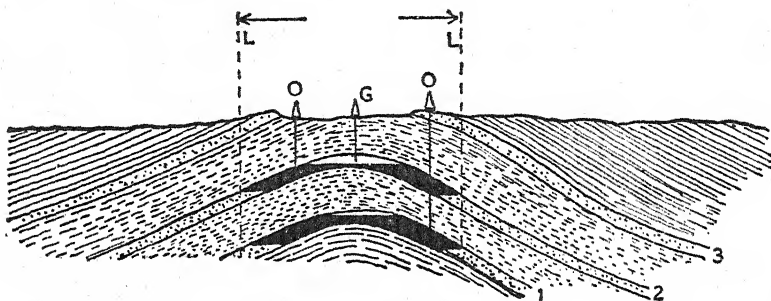


FIG. 54.—Section through an oilfield.

Oil sands numbered 1, 2, 3, but all oil from 3 has escaped ("seeped" away to the surface). Oil shown in black; O, O are oil wells; G is a gas well. L—L=limits of field.

points marked L L (limit of the field) would not strike oil but only water. The gas underground is often under great pressure, and if the gas is hit it will give rise to a gas well, and it may be difficult to control the gas as it rushes out. It is important to preserve the gas underground because it exerts pressure and forces oil up the neighbouring wells. The existence of an oil-field can only be proved by drilling, and drilling should only be carried out where there are favourable indications from the underlying structure, but the desire to get rich quickly often results in wells being put down without any direct evidence or expert advice: this is known as "wild catting."

There is a very important difference between coal and oil. Oil will flow; coal is a solid. Thus an oil well taps a variable

and sometimes considerable area round the actual bore. Many of the oilfields represent the accumulation of oil from over large tracts of country, and thus a single well may tap the reserves of a big area. Many of the great oilfields, particularly in America, have an extraordinary short life. They have reached their maximum output within two or three years of their discovery and then have rapidly declined. For the maintenance of the enormous output of crude oil the world rather depends upon the continued discovery of new fields, and although there is no sign yet of the exhaustion of the world's oil supplies, it would seem that this exhaustion will come long before the exhaustion of coal.

The exploitation of oil is relatively simpler than that of coal. Wells are drilled either by percussion—a heavy bit on the end of a wire rope is alternately raised and lowered and the loosened material washed out by water—or by rotary apparatus, the solid core being cut out and drawn to the surface. In either case the resulting hole is lined with iron tubes, anything in diameter from 2 or 3 inches to 17 or 20 inches. When the oil sand is reached the oil may either rush into the well and spout out at the surface as a "gusher," or it may have to be pumped up. Wells of up to and even exceeding 10,000 feet are drilled, but a very large number are between 3,000 and 4,000 feet in depth.

The crude oils as obtained from the wells vary greatly in composition. They may be divided roughly into two classes, those with a paraffin base and those with a petrol base. The treatment to which the crude oil is subjected is determined very largely by its composition. Large quantities are used direct as fuel oil, but if the crude is rich in the lighter constituents it is obviously economic to split up the crude by fractional distillation to obtain the valuable petrol as well as kerosene or lighting oils and the heavier lubricating oils which are left. A further supply of petrol is often obtained from the medium oils by actual chemical alteration, through the process known as "cracking."

The world's coal resources can be calculated, because if the entire area of the coalfield is known and the number and thickness of seams, it is not difficult to work out the total quantity available. It is not possible to calculate the world's oil resources

in the same way. Compare Figs. 55 and 56, the second of which shows the amazing increase in the world's consumption of oil in recent years. There was at one time a fear of a decline, but it was followed by enormously rapid increases, and production exceeded the demand in spite of the rapid growth in the use of petrol for motor vehicles. Nearly all countries of the world are now practising a restriction in their output. The next diagram shows the principal producers. Notice the importance of the United States production, nearly two-thirds of the world's total. The oil production of the world at present may be summarised as follows.

*use, produce, supply, of, world, oil.* The oilfields of the United States are in several states; the most important are now those in the heart of the continent, second in importance are the fields of California, lying along the coast tract near Los Angeles; a long way behind are the fields on the coast of the Gulf of Mexico, in Texas and Louisiana, and then the fields of the area of the north-eastern states which were formerly much the most important.

In 1923 Mexico was the world's second producer and produced 29 per cent. of all the world's oil, but Mexico has fallen behind in the race now, while the development of Canada's fields is progressing.

The production of oil in South America has increased by leaps and bounds in recent years. There is a huge production from Venezuela, especially from round the shallow Gulf of Maracaibo. There are <sup>small</sup> fields in Colombia, Ecuador and Peru too, and in the small British island of Trinidad and also in the Argentine, on both sides, you will notice, of the great Andean chain. It is common to find oilfields in the gently folded rocks which occur on either side of the great mountain chains of the world.

Europe as a whole is poor in oil, the only two important countries being Rumania and Poland, though Germany has small quantities in Hanover, and France carries on the mining of certain oil sands at Pechelbronn. ~~Russia~~, on the other hand, is an important producer and the oilfields occur on either side of the great Caucasus chain, notably around Grozny and Baku, whilst a chain of new fields has been discovered in the last few years parallel to the Ural Mountains.

Africa is practically without oil except for some small fields on the shores of the Red Sea in Egypt.

In Asia there are the fields of the Near East—the enormously

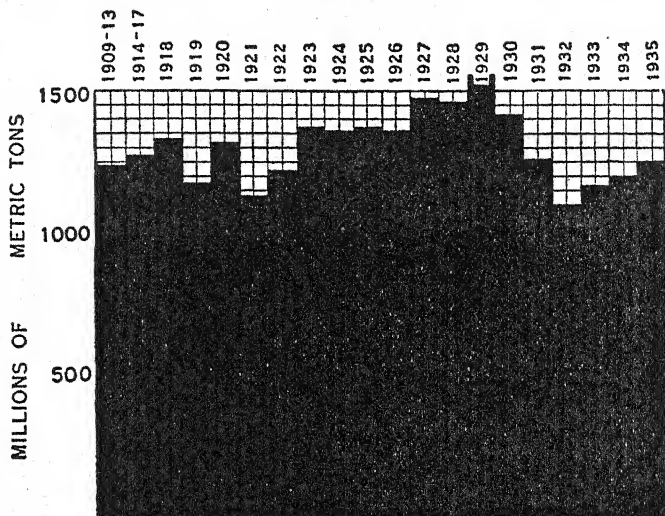


FIG. 55.—Graph showing the world production of coal.

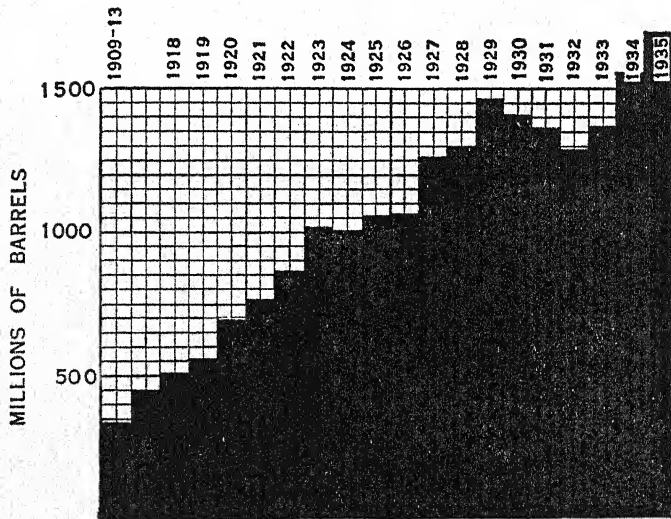


FIG. 56.—Graph showing the world production of oil.

In 1936 the total increased to 1730 million barrels (7 barrels=one ton), and in 1937 to 1960 million barrels.

important fields of Persia, or Iran, near which are the newly developed fields of Iraq from which the oil is taken by pipeline across the desert to the Mediterranean, and the still more recently discovered field on the southern shores of the Persian Gulf in Saudi Arabia.

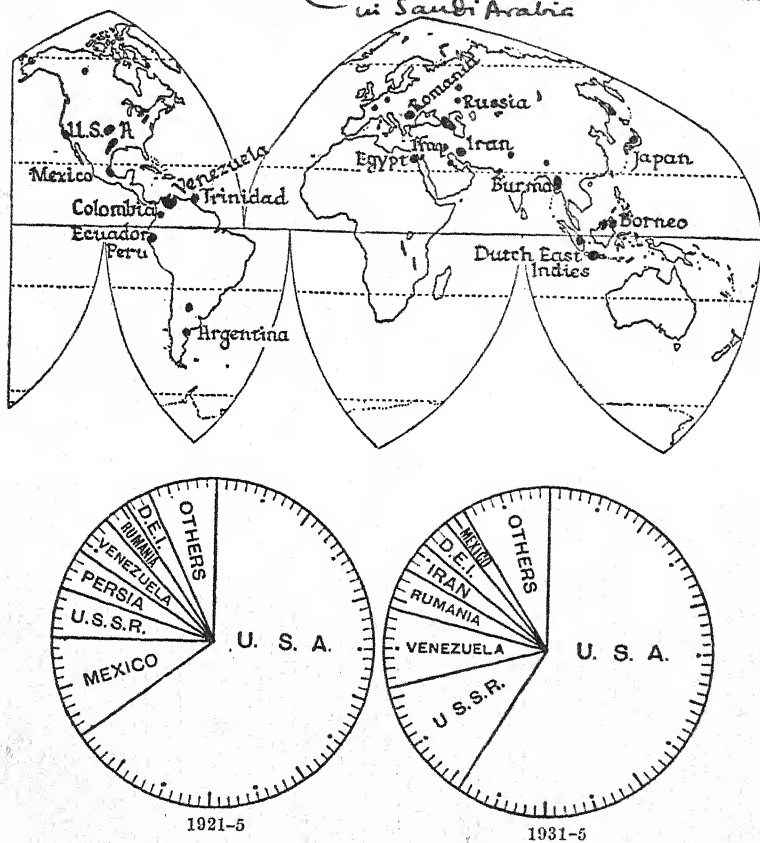


FIG. 57.—The oil-producing countries of the world.

The diagrams above show their relative importance.

Gulf found in 1935. Farther east are the important fields of Burma; (Burma and Trinidad vie with one another in being the most important producers of the British Empire) there are also small fields in the Punjab and Assam. The Dutch East

Indies have a large and important production in Java, Sumatra and Borneo, the latter being partly in Dutch and partly in British territory. Japan has a small production, but not sufficient for her home requirements.

The search for oil in Australia has so far proved entirely fruitless. It will be noticed in the map that there are large gaps in the world distribution of mineral oil. The conditions in these areas are for the most part not suitable. It should be noticed that the British Empire is as a whole very poor in oil, and only produces about 3 per cent. of the world's total, from Borneo, Burma and Trinidad. The great proportion of the world's oil is, however, controlled either by American or British companies. Very little of the oil is actually used in those areas where it is produced, and very seldom does an oilfield give rise to an industrial area, for the oil can be sent long distances by pipe-line, and usually at the ports it is refined into its constituent parts or exported crude. The export of crude has given rise to the need for special types of vessel for the transport—oil tankers. There is competition now between the producing countries and the consuming countries as to which shall do the refining; in some countries the refineries are at the exporting ports, in others they are at the importing ports. In studying the trade in oil one thing is rather remarkable: despite the enormous production in the United States, consumption keeps pace with output. There is an import of crude, an export of refined oils. The demand for oil is, in the main, from those countries which have large numbers of motor cars and use petrol or those countries which have considerable navies which have been converted to oil fuel.

The irregular distribution of the world's oil has given rise to two recent changes. One is the production of oil from coal; there are several processes by which this is done and it is now being carried out on a large scale in Britain (by Imperial Chemical Industries at Billingham) by what is known as the hydrogenation of coal. Hydrogen gas is forced at high pressure to combine with some of the constituents of coal, thereby causing the conversion of the solid coal to liquid oil. By another process—low-temperature carbonisation—the coal is converted partly to the smokeless fuel coalite and only partly to oil. Secondly, some countries produce oil from oil shale. The oil in oil shale occurs in very small globules, and, as a rule, is

obtained by a process of destructive distillation. The shale is mined and then heated in a closed retort, so that the oil comes off in the form of gas which condenses to liquid oil on cooling. The process is expensive and it is difficult for oil to be produced at such a cost that it may compete with the product of natural wells.



FIG. 58.—The hydro-electric power works of Europe.

The works shown on this map in Northern Czechoslovakia now lie in German territory.

*Hydro Electric* **Water-power.**—Water-power was early used by man as a driving force for his machinery, and in the early days many towns were sited near waterfalls which could be used in this way. Geographers have traced out, for example, the "Fall line" towns in the eastern United States. The situation of the early iron furnaces in the neighbourhood of Sheffield was deter-



mined in just the same way, and they were located wherever there was a fall or rapid on one of the Pennine streams. But now the water-power is actually utilised in the form of electricity which is capable of being transmitted up to 300 miles from where it is generated, so that there can actually be an export of water-power in this way as there is of other products, though not over large stretches of water. It is, for example, not possible for New Zealand at the present time to export her surplus water-power, however much she may desire to do so, across the sea to Australia; this may come in the future.

Water-power resources are naturally greatest in hilly or mountainous regions—giving a big fall of water—where there is heavy or constant rainfall. Excellent examples are Norway and Switzerland, and it will be noticed that those countries rich in water-power are often those which have no reserves of coal or oil. Coal and oil are not as a general rule found in very mountainous tracts. On the whole, when we take the map of the world and trace out the mountain belts, we can see the places where water-power is available. Those countries which have *developed* their water-power resources are the United States of America, Canada, Italy, Japan, France, Switzerland, Germany, Sweden, Norway and Spain, to which we must add among the newer countries of the world, Australia (especially Tasmania) and New Zealand. A start was made in 1935 to utilise the Victoria Falls in Africa. By way of contrast we may note the position in the British Isles, where there has been in the last few years the development of the Grid system linking up formerly independent systems. The electricity which supplies the Grid is derived from the use of coal; it is "carbo-electricity," though to some extent water-power is utilised in the Highlands and the southern uplands of Scotland, and in northern Wales. There is not enough water-power available in this country to supply the country as a whole with electricity. The Irish Free State, which has very little coal, has the largest hydro-electric power works in the British Isles—those on the River Shannon, near Limerick.



## CHAPTER VII

### The Geography of Settlement

If we examine a map of the world showing the distribution of man we are struck at once by the way in which human beings are massed together in some areas, whilst other parts of the earth's surface are almost uninhabited. While it is true that there is a considerable amount of mal-distribution of population, that is to say, that there are areas thinly populated which could support more, and other areas which are over-

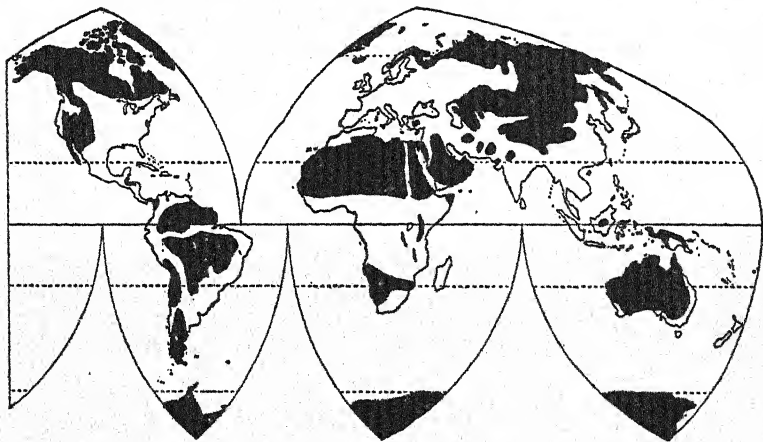


FIG. 59.—Sparsely inhabited regions of the world.

populated, it may still be said that the world distribution of population in general reflects the suitability of geographical conditions. Let us examine the reasons for the world distribution of population.

**1. The Influence of Climate.**—Fig. 59 is a map of the world showing sparsely inhabited regions, all parts in black having less than two persons per square mile. If we compare this

with the next map, Fig. 60, which is a map of the world showing regions deficient in rainfall, we are struck by the close correlation. In temperate latitudes little cultivation is possible where the rainfall is less than 10 inches a year, and in tropical latitudes more than this is required and there is comparatively little cultivation where the rainfall is less than 20 inches a year. We may say, then, that the bulk of mankind is settled in the well-watered regions.

It so happens that in the far north the regions of low rainfall or low precipitation are also regions of extreme cold, and we find

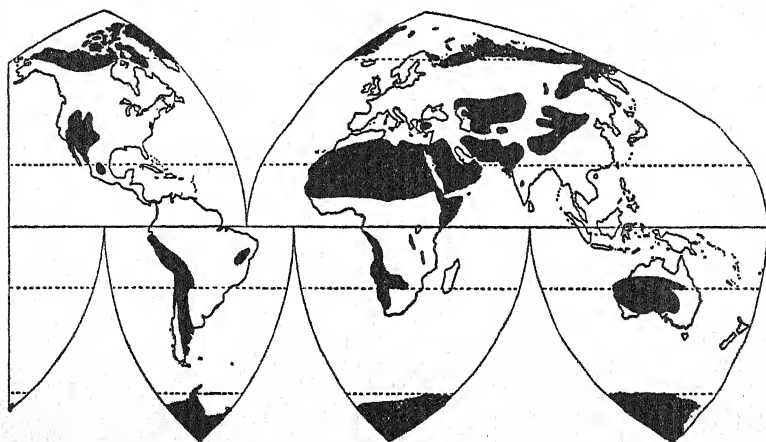


FIG. 60.—Regions of the world deficient in rainfall.

therefore that cold is necessarily a limiting factor to extensive and close settlement. We may, indeed, go so far as to say that some of those climatic regions which we studied in Chapter III are more favourable to the life of man than are others, though it is difficult to say what is the *ideal* climate for man's development. The great civilisations of the ancient world, Greece, Carthage, Rome, Minos, and to some extent Egypt and Babylonia, are concentrated in a remarkable way in regions of Mediterranean climate. Other great civilisations have a tropical seat of origin—India, Mexico; others in the rather warmer parts of sub-tropical lands, for example, China. In these warmer climates there is a tendency for maturity in the individual to

be reached at an early age; this is notably the case in India, and it may be that civilisations reached maturity earlier also in these warmer climates. In colder climates the development of the individual and of nations has been slower. Some people to-day are accustomed to describe as ideal a climate which is sufficiently cool to encourage outdoor manual work for the whole year and, in addition, a winter sufficiently cold to render physical exertion desirable and to offer a contrast to the heat of summer. In common parlance, man is "bucked up" by the change in seasons.

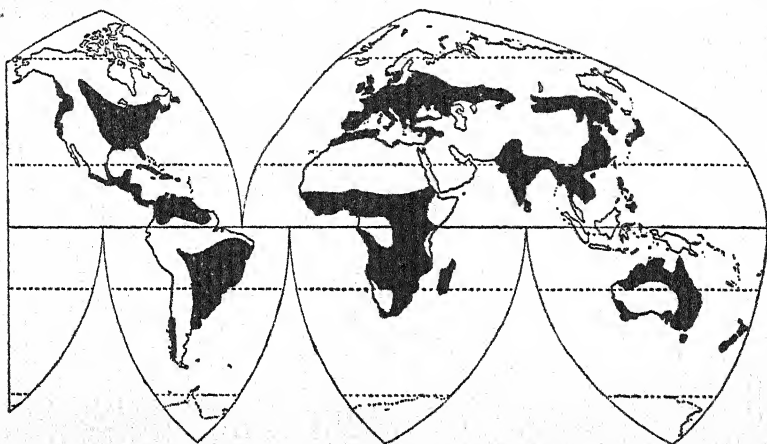


FIG. 61.—Regions of the world with favourable climates.

We may list as favourable climates, then, the monsoon climate of tropical lands, covering at least a certain part of tropical regions, whilst in mid-latitudes there are certainly the Mediterranean regions, temperate west coast regions, the mid-latitude grasslands, as well as the east coast types. As a comparison with Fig. 61 will suggest, most of these regions of favourable climate have at least a moderately dense population. We may notice here the gradual conquest by man of his environment as far as climate is concerned. The backward and uncivilised people are slaves to climatic control, but with advance to civilisation the greater control does man assume over these factors. This is particularly well seen in the equatorial regions—compare Malaya and the Amazon Basin.

**2. The Influence of Physical Features.**—If we now examine the conditions within any given climatic region we find that, on the whole, if the climate is favourable, man and his settlements will be restricted to the non-mountainous areas where there is flat or undulating land suitable for settlement and cultivation. ✓ Thus the differences in the distribution of population in north-western European countries are largely determined by topography.

**3. The Influence of Soil.**—Soil also affects, in a marked way, the distribution of population in a given climatic region. Areas of rich soil, for example, support a heavy agricultural population, areas of poor soil support but a meagre population.

**4. The Influence of Minerals.**—The influence of minerals is rather different from that of the other factors. There is no correlation between the distribution of minerals and favourable climatic conditions, and we find therefore that mineral deposits, whether coalfields, oilfields or metalliferous mining fields, give rise to local concentrations of populations which have no connection with climatic conditions. ✓ When one says no connection one must remember that the other factors, if favourable, will already have led to a considerable concentration of population, and so to the exploitation of the minerals concerned. Thus we find mining camps and oilfields in the midst of deserts which would otherwise be uninhabited. ✓

**Local Distribution of Population.**—So far we have considered the factors of the broad distribution of the population over the earth's surface. When we come to the study of settlements we shall do well to distinguish between urban and rural settlements. When man is utilising the natural herbage for his flocks and herds, or when he is cultivating the ground, it is necessary for him to be near the scene of his activity. Other things being equal, he will settle near a sure supply of water, and we find settlements and villages determined by the position of a spring or river which supplies the water, and it is this which has determined the position of many of the villages of Britain. In some types of country, such as clay land, there is no difficulty about a water supply: it is only necessary to make a hole in the ground and water is immediately available in the form of a pond. In such country scattered population is usually the rule

rather than nucleated villages. Other areas may be too wet and it is necessary to select a drier point for protection from flood, and so we may distinguish in settlements :

(a) Wet-point villages and

(b) Dry-point villages.

In some rural populations other factors are more important. For purposes of protection a selection of what may be described as fortress points may be made, and the actual form of the village has often been determined by this need for protection.

*Urban Centres.*—In a pastoral or agricultural country it is usually the case that certain villages become larger than others ; they may serve as administrative centres, as route centres or as market centres. Early manufacturing towns have often grown up for purposes of supplying commodities to the inhabitants of the surrounding rural areas. Birmingham, in this country, for example, owes its origin to its position as a convenient meeting place for the farmers of the neighbourhood, and its iron and steel industry started with the necessity of supplying horseshoes and agricultural implements to the cultivators. A town which is once established may often tend to grow for reasons which have no connection with the original geographic advantages. We will consider separately the reasons for the growth of manufacturing areas and the reasons for the growth of ports and route cities.

## CHAPTER VIII

### The Geography of a Manufacturing Industry

*What are the geographical factors which*

In a recent examination for the Associateship of the Institute of Bankers the candidates were asked to "Choose a leading occupation in any part of the country with which you are familiar; analyse carefully the natural or geographic factors (a) which have assisted its development, and (b) which are favourable or unfavourable to its further development at the present day." In the same examination held in April, 1935, the candidates were asked to "Select one of the special or depressed areas of Great Britain and describe the natural or geographical features which have led to the establishment or growth of the chief industries and which affect the present position."

It is a very important branch of the study of modern Geography to attempt to answer such questions as these, and we will endeavour in this chapter to lay down the general principles to be used in studying any particular manufacturing industry and its development in a particular area. Assuming that the necessary capital and incentive for enterprise are present, the factors for the development of a manufacturing industry are four:

- (a) A supply of raw material.
- (b) Power.
- (c) Labour supply.
- (d) Markets.

Let us examine each of these essentials in turn.

(a) *A Supply of Raw Material.*—As we have already seen, some raw materials are widely distributed in their origin, others are remarkably localised. Thus if we take the great forests of the world there is no reason why, from the point of view of the raw material, a wood-working or pulp-making industry should develop in one part of the forest region rather than in another so long as the raw material is at hand. Similarly, suppose we

take the sheep and wool in the British Isles; in most parts of the British Isles there are numerous sheep, and a woollen industry might well arise in any part; indeed, in the Middle Ages, this was the case, and there were small village industries for the manufacture of woollens in widely distributed areas. Some of them are still left to-day, *e.g.* the work of spinning and weaving of wool for "homespun" amongst the crofters of Scotland or amongst the peasant farmers of western Ireland. Where the raw material is very bulky in proportion to its value, or very heavy in proportion to its value, or in the preparation of which there is a great deal of wastage, there is still a marked tendency for the manufacturing to be carried on as near the source of the raw material as possible. Builders in this country import large numbers of ready-made doors for houses from Sweden or from western Canada; the timber from which these are made is bulky in proportion to its value and in sawing up the trees and in making the doors there is a great deal of waste; hence the advantage of carrying out the industry near the source of the growing timber. In many mining enterprises the amount of available metal in the ore is often quite small; it may be less than 5 per cent.—and some silver ores can be worked even if they only contain 0.5 per cent. of silver or even less. Gold ores contain only a few ounces per ton, and it certainly would be ridiculous to transport the raw material before extracting the valuable part which is required. Thus we find that the smelting industry is usually found where the raw material itself is found. On the other hand, where the wastage is smaller, as in the case of some of the richer iron ores, although they are bulky and of comparatively small value, they are transported away from the source of origin, provided good, cheap means of transport are available.

Nowadays there is another important factor. The producers of the raw material like to find further occupation for their people and so very often carry out at least some of the processes of preparation rather than export the raw material.

(b) *Power*.—We have already dealt with sources of power and we have seen how, in the old days, towns and the accompanying manufacturing industries had to be located where there were water-wheels to turn their mills or where coal was available for their factories. With the increasing use of elec-

tricity this tendency has disappeared, and it is remarkable that during the last two or three years 90 per cent. of all the new factories in the British Isles have been worked by electric power, so that they are independent of the actual sources of the power itself.

(c) *Labour Supply*.—Only manufacturing industries on a large scale and backed by a large amount of capital can afford to start in an entirely new area and build the houses, etc., which are needed for the workpeople and so to establish a new centre. Smaller enterprises tend to go near existing towns or centres or where they consider it possible to obtain the necessary labour supply. Small towns are usually avoided as the surplus labour available may be limited. There is a greater chance of obtaining the necessary labour, especially if the factory expands, in the larger towns. Hence it is a case of "to him that hath shall be given and from him that hath not shall be taken away even that which he hath." In many new industries it is necessary to train the labour required, though in some regions, particularly the older countries, there exists what may be described as a reservoir of skilled labour and where traditions of work are handed down from parent to child, *e.g.* amongst the textile workers of Lancashire. There are some who hold that the Trade Union system rather encourages an immobility of labour, for the unemployed man who is a member of one union finds it difficult to enter an entirely different occupation where he thinks there is a possibility of finding work. Geography books are apt to be careless when defining labour and often talk about cheap labour. Cheap labour, unless it is at the same time efficient, is not necessarily advantageous. But there are, of course, many types of labour. Thus in silk spinning, the difficult manipulation necessary makes the work particularly suitable for women and girls who are content with relatively low wages, as they are in Japan.

(d) *Markets*.—It is an obvious rule that the finished products of a country must, in the ordinary way, be more valuable than the raw material which has gone to their making, since the value of the raw materials have added to them the value of the power or fuel used and the value of the labour utilised in the various processes. Although the manufactured goods may be made for a world-wide market, it is a distinct advantage if there



is at the same time a large local market ready to hand. This is one of the reasons for the remarkable growth of industry in recent years in the neighbourhood of London. Around London there is a market of 10 million people. Many new inventions can be manufactured in small quantities and tried out on this large local market, before the commodity is launched on the world as a whole. The same argument applies to any of the larger cities, and is another reason for the continued growth of a city.

From this analysis, then, it must seem that all industry would gradually become concentrated in the larger cities, and once they have become large they must become larger still at the expense of their smaller fellows. But there are limiting factors.

First of all the relative advantages of one city and another depend to a considerable degree on facilities for transport; for heavy and bulky raw material of overseas origin it is an obvious advantage to have the manufacturing industry at a port or within easy reach of tidal water. As an example of this we may quote the oil refineries which are situated on the coasts round the British Isles at a safe distance from the larger towns, but in such a position that they can receive direct from the oil tankers their supplies of crude oil. Nearer the larger towns themselves are the gigantic flour mills, using imported wheat. We may quote as an example of position favouring a particular industry the heavy iron and steel industry of Middlesbrough. The town is well situated near a supply of raw material of home origin, the coal and coke from Durham, the iron ore from the Midlands and the Cleveland hills, at the same time the port facilities favour the importation of iron ore from Sweden. The town is equally favourably situated for the export of the heavy and bulky products of the industry—largely pig-iron and steel goods.

For manufactures destined especially for the home market, an important requirement is a good distributive system by road, rail and, to a less degree nowadays, by canal. On the other hand, amongst the factors which limit the growth of cities is the increasing congestion which may destroy the facilities of transport, which may render land so valuable that the extension of factories is scarcely possible, and which make extremely difficult the housing of the labour supply, or, alternatively, may

cause the labour supply to live at such a distance that much time and energy as well as money are wasted in getting to work. We have here got into the realm of town planning and one of the remedies suggested is the growth of satellite towns round the major one. Of course, to a considerable degree this has already happened with regard to London. We may here notice that a large town or city, even though it is primarily a manufacturing town, has other functions to fulfil. Not infrequently each of these functions is carried out in one particular quarter of the town. Let us take London and its functions.

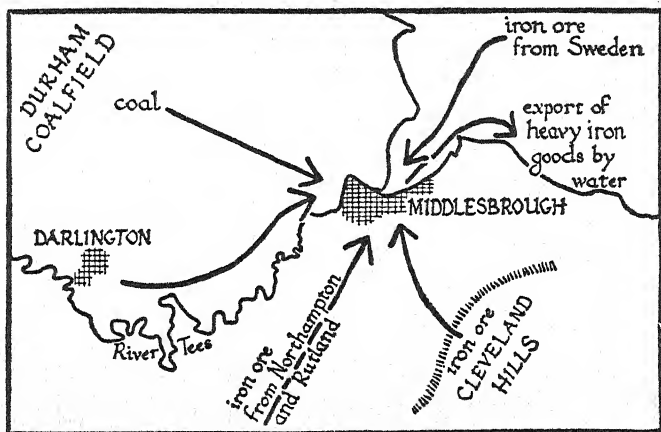


FIG. 62.—Position of Middlesbrough.

(a) The administrative function: as the capital of Britain and the British Empire, this necessitates large areas devoted to government buildings and government offices. These, as we know, are located particularly in the neighbourhood of Whitehall and the Houses of Parliament.

(b) The commercial function: the offices for directing the business of commerce have long been located in one region known as the City, around the Bank of England as its centre, but which of recent years has, owing to expansion, overstepped the original bounds.

(c) The industrial function: in London this is largely carried out in the East End and in the north-east.

(d) The social function : this we may consider to include the housing of the people and their amusement and entertainment. The hotels, cinemas, theatres of the West End are characteristic of this function, to which we may particularly add the retail shopping areas.

(e) The movement or transport function : this is performed by the docks along the Thames on the one hand and the great railway termini on the other.

Only a portion of any city can be devoted to the actual factories of a manufacturing industry. Then we must also remember that in most of the older countries the manufacturing industries have undergone a process of evolution, and so also have the centres where they are carried out, and we have the important historical factors to be considered. Often the present industry is but little related to the geographical factors of the neighbourhood.

Let us now apply these principles and attempt to answer the questions with which this chapter began. As an example of method let us examine the woollen industry of Yorkshire. How have the natural or geographical factors assisted its development? The woollen industry of Yorkshire is an old-established one and so we must go back to the early days, in the beginning of the industry, to see the full effect of the geographical factors. Primarily the woollen trade is associated with the natural suitability of the Pennine Uplands for sheep rearing. The abundance of lime-free water needed for scouring and dyeing purposes, and the existence of numerous possible sites on the small and rapid streams for water-wheels, encouraged the growth of small manufacturing villages. In the sixteenth century the isolation of the valleys encouraged the movement there of craftsmen away from the crowded towns of the lowlands where they are hampered by guild restrictions. The isolation also encouraged those who wished to work away from the ties of a religion they found galling. So much of the energy behind the industry came from Nonconformists—people who looked upon honest toil in business as a divine calling. In those early days the spinning and weaving were done largely in the higher parts of the valleys near where the sheep themselves were pastured. It was a rural organisation, a combination of domestic industry and agriculture and a home food supply, and each

home had its own cultivated fields as well as its own spinning and weaving sheds. Lower down in the valley bottoms were the fulling mills for finishing off the cloth by milling or fulling the surface. Soon the industry outran the local supply of wool, and so took to getting supplies from Lincoln and Leicester.

Now we begin to find the industry growing by its own momentum. The merchants became wealthy and in the early eighteenth century began to introduce the manufacture of worsted material, so that by 1770 the output of worsted cloth from Yorkshire equalled that of Norwich, then the leading centre of the industry. By the end of the eighteenth century the principal Yorkshire woollen towns were already in existence and actively engaged in the industry. Then came the Industrial Revolution and the great change in the character of British Industry; industry became concentrated on or near the coalfields. So to-day we find that the woollen area of Norwich—right away from a coalfield—has entirely disappeared. But the West Riding area was situated on a coalfield, and so it became stabilised; great factories with central, nodal situations utilising coal entirely replaced the small factories depending on their water-wheels. We have already mentioned the importance of soft water, which has remained an important consideration, and is so even to-day. Where the rivers drain from the Carboniferous Limestone their water is hard, and factories are markedly absent, so that apart from one or two outlying centres on the headwaters of the Dearne, and in the Wharfe valley, the industry is confined essentially to the coalfield portions of the Aire and the Colne and Calder valleys and to the area between them. With the growth in size and scale of the industry it has also become specialised and each of the principal Yorkshire towns has its own speciality in woollen or worsted manufacture.

Let us turn now to the geographical factors which are favourable or unfavourable to the further development of the industry at the present day. The industry in Yorkshire still has the advantages mentioned in the paragraphs above:

(a) *Raw Material*.—A small local and English supply, a large overseas supply of a raw material which is readily transported and which can easily be received. Another important raw material, often forgotten, is the water.

(b) *Source of Power*.—Though many of the factories are

turning to electricity, the coal is on the spot, and this aids the generation of cheap electricity locally.

(c) *Labour Supply*.—Textile working has become a tradition in the area and there is a very large supply of labour.

(d) *Markets*.—Woollen goods of various types are important in a country such as Britain, which has a cool climate, and so there is a constant home demand which must be satisfied. Men's clothing, much of women's clothing, a considerable proportion of furnishing in the home, including carpets, all demand the products of the woollen industry. The dependence upon overseas exports is limited. The whole region is favourably situated in a central position with regard to transport—by rail in particular—to all parts of Britain.

It is not surprising, therefore, to sum up, to find that the Yorkshire textile district is a comparatively prosperous one, even in times of depression, and the area has not been scheduled as one of the "depressed" or "special" areas.

Now let us contrast the Lancashire textile region. Let us consider first the factors influencing its development in the past. The early history of the industry in Lancashire is largely similar to that of Yorkshire, and it is of interest that the early industry of Lancashire was, like that of Yorkshire, one of woollens. At the stage when the West Riding began to import wool from other parts of Britain we find Lancashire, because of its situation on the western side of the Pennines, beginning to import flax from Ireland. The sites of the more important towns were determined, as in Yorkshire, by the presence of water-power from the steeply graded streams and also the presence of soft lime-free water in these same streams. Manchester, as a non-corporate town, proved attractive to many weavers. Lancashire early showed adaptability by using flax also, and Lancashire was ready as each change came along to incorporate it in the industry. It took readily to the import of the new material, raw cotton. The local home industry changed gradually to the factory industry, largely as a result of inventions actually within the area. But these advantages would scarcely have been enough had not Lancashire the necessary advantages when the other great changes came. With the Industrial Revolution it was found that Lancashire had coal; in fact, the coal could not have been in closer proximity. Later

the development of chemical bleaching was aided by the presence of the Cheshire saltfield only a few miles away. The need for transport, including export, was satisfied by comparatively easy canal and railway construction and by the enlargement of the existing ports of Liverpool and Manchester. So Lancashire built up an enormous industry based upon the import of raw material and the export of a large proportion of the manufactured goods; in fact, a large proportion of the cotton goods are made essentially for the foreign market—the cotton cloth for the hot climates of the world, particularly for the very important Indian market.

Turning now to the way in which geographical conditions affect the present position, we note the following points :

(a) *The Raw Material*.—The import of raw cotton has been rendered easy but the supply is less assured; in the United States more and more is required by the home industry and so other sources of supply must be sought. Advantages of soft water and of the neighbouring chemical industry also remain.

(b) *Power*.—Resources for Lancashire remain.

(c) *Labour Supply*.—The large labour supply of Lancashire used to the textile industry is waiting for its full utilisation.

(d) *Markets*.—Here we have Lancashire's great trouble. The closing of so many foreign markets as the result of nationalistic development has given the necessity for Lancashire to turn to other industries. The Lancashire textile region may, in the future, become prosperous again, but it can never be prosperous on the same basis as it has been in the past.

The principles enunciated above should be applied to regions or to industries of which the reader of this book has personal knowledge. It may often be necessary to go back a long way in history to trace the operation of geographical factors; at the present day there may be little or no connection between the dominant industry of an area and its present geographical features. A good example of this is Coventry, with its present manufacture of motor cars. Skipping some of the intervening phases it may be said that Coventry owes its industry to its convenient distance from London and the attraction which it had for immigrant Flemish silk workers. They stopped there on their way northwards and many of them decided to settle. So there grew Coventry's association with the silk industry and

particularly with fine silks and later with the manufacture of ribbons. For this fine manufacture special machines were required, and it is just one step from Coventry's interest in specialised machines to Coventry's interest in sewing machines and a small step to other fine machinery of rather a different type—bicycles. With an increase in the standard of living and a rise in the demand, the cycle was the forerunner of the motor bicycle and the motor car, and here we have to-day Coventry's great industry, for which it would be difficult to find an adequate geographical basis for its location. There are many examples of the same sort, and great care must be taken in searching for the geographical bases of an existing industry.

A similar example may be quoted from the United States. In the days when the western movement of people began there was a natural demand for buggies and wagons which would stand the strain and stress of a long journey. They had to be made of the best wood by the best makers, and it was natural that a town should grow up near a supply of good, hard wood, just east of where the great rolling prairies began, and should have an important trade in the manufacture of these vehicles. But the time came when the buggy was no longer required, but the aptitude for making carriages remained. From the buggy using a supply of local hard wood can be traced the great motor car industry of certain towns to-day.



## CHAPTER IX

# The Commercial or Economic Geography of a Country

"Give a brief *systematic* account of the economic geography of one of the following——" Who has not been met with a similarly worded question in a paper on Commercial Geography? It is the type of question that almost every candidate tackles, unfortunately carefully ignoring the word which is significantly printed in italics; or it may be that the candidate looks through the list of countries which are given for alternative selection and decides that he does not really know anything about any of them, and folds his arms.

Yet this is where Geography should render service to our daily life at home, in helping us to decide for ourselves of the rights and wrongs of the problems which are put before us in fragmentary form any time we open our daily paper. Let us, therefore, lay down a model system which can be applied with suitable modifications for almost any country or area. We shall consider its commercial geography under three main headings:

- (a) The natural or geographical conditions, especially in so far as they affect the life and activities of man.
- (b) The human inhabitants, the character and distribution of their activities and the use which has been made of the resources of the country.
- (c) Foreign trade and trade relationships.

Now let us take each of these three main headings in order.

### (a) Natural Conditions

i. *Position and Size*.—We should first consider the position of the country to be studied in relationship to the surface of the world as a whole, to its major land masses and particularly to its neighbours. Position is often *the* question of first signifi-



cance for some countries. Let us take, for example, New Zealand, in the Southern Hemisphere, in mid-latitudes a little nearer the equator than are the British Isles in the Northern Hemisphere. There are two main islands, distant a thousand miles from the nearest land mass of Australia; equally far distant from populous Europe, whether approached from the Indian Ocean or the Pacific Ocean. Or again, take the significance of the position of Switzerland—land-locked, no direct outlet to the sea, in the heart of Europe readily accessible from all the great European countries, a natural meeting place. But together with position we should notice the salient aspects with regard to the *size* of the area to be considered. We should avoid the mistake of trying to commit to memory the exact details of the size in square miles, but general approximations really are valuable. Let us bear in mind, for example, the figure of 3 million square miles when we are thinking of Australia or the United States, or let us form a rough mental idea of comparisons, for example, of the British Isles and New Zealand, or of Palestine and Wales from the point of view of size.

ii. *Physical Features*.—Obviously the broad arrangement of the physical features of a country is important and in extreme cases may be almost a dominating factor. Let us think in this connection of Holland in contrast to Switzerland, or near neighbours where the importance of physical features is extremely significant, causing differences amongst peoples which are racially similar, e.g. Norway and Denmark.

iii. *Structure and Minerals*.—In commercial geography we are concerned only with the broad features of structure, such as the presence of large masses of ancient, crystalline rock with poor soil but important minerals in contrast to great stretches of easily cultivated fertile loess or alluvium. The presence of important mineral deposits is clearly a matter of the utmost significance.

iv. *Climate*.—At this stage fear may begin to enter the soul. How is it possible for the poor unfortunate student of commercial geography to know all about the climate of the countries of the world? What should he know about the climate of Denmark, or, worse still, of Finland? But if he will only think of the general ground covered in Chapter III of this book, he will realise that every country of the world must fall into one

of the significant world divisions. He has therefore only to form a mental picture of the position of the country and its world relationship and a mental picture also of how it stands in relation to the great climatic belts of the world, and most of the facts of the climate are already known to him. A few local details and he has an excellent knowledge of the climate of the specific area in question.

v. *Vegetation, Natural or Artificial*.—The same applies here as in the case of climate; the student has a mental picture of the country fitting into its right part of the world; it fits in also to the great vegetation regions; it must of necessity share in the artificial vegetation or the agricultural productions which are common to or characteristic of the major world regions. Thus we find we know by reasoning quite a lot about the area concerned, to which we may add important local differences or peculiarities.

vi. *Animal Life*.—This is by no means always significant, but where it is it will be found that it is once more a question of fitting the country into its appropriate world area.

### (b) The Human Inhabitants and their Activities

i. *The Races of Man*.—Commercial geographers are not expected to be anthropologists nor ethnologists, but we shall find, if we think about it and leave a niche in our scheme for its expression, that we know a certain amount about the races of man living in various parts of the world. We can obviously recollect the significant facts about the people of Japan or China; we should be able to see in the mixed origins of the American people reasons for their mental receptiveness and active constructiveness and their varied viewpoints, not always in accordance with our own. But many of us forget, perhaps, how well we can apply the same principles that we think of almost automatically in connection with the people of the United States, to the equally virile and progressive people of the Argentine, remembering the fundamental difference, the abundance there of Spanish stock. Nor are we likely to lose sight of the significance of the ideal of the present population of "White" Australia or New Zealand. We may usefully, under this same heading, refer to language, distinguishing where

necessary between the native language and the commercial language used mainly in the areas concerned.

ii. *Population, Density and Distribution.*—We should know the main points about this ; whether the population is mainly a scattered rural one or concentrated particularly in towns as an urban population. We should know whether a country is crowded or sparsely populated, and in those countries where it is significant we may here deal with principal towns or ports, and the capital.

iii. *The Activities of the Population.*—We shall probably have learnt to some degree under minerals and vegetation, above, of some of the activities which are determined by the natural resources of the country. In this section we may develop the subject and deal with manufacturing industries.

iv. *Communications.*—Here we must consider the roads, railways (and water transport where significant), of the country, again emphasising those things where they are especially important, and noticing from the point of view of commercial geography, particularly the relationship between the communication network and the principal outlets of the country—the ports.

### (c) International Trade and Relationships

In the process of the preceding consideration we shall have dealt with the products of the country and the activities of its inhabitants, but we may not have dealt with the very important distinction between the products intended for home consumption and those which are intended for export. We shall here deal therefore with :

- (a) Export.
- (b) Import.
- (c) Direction of the foreign trade.
- (d) The lines of communication and the ports of entry which are used in connection with them.

This may sound a formidable list, but it will be found that a great deal of it results from a preceding consideration of the country itself, its resources and their utilisation. Some of the excess products available for export will be readily found, and deficiencies which the country will clearly need filled will also result from the preceding consideration of its general geography.

In setting out this skeleton framework for the study of the commercial geography of a country, we have ignored one important thing. If the area dealt with is a large one, there will be great variations from one part to another and it will be necessary to carry out the division into the constituent parts which the geographer calls the natural regions, each region having its own general peculiarities. It is best to do this and to give in outline the character of the regions concerned at the end of section (a) above. It will be found in the chapters that follow that the descriptions of the countries there given follow broadly the above outline. We have not attempted to repeat again and again the headings, and what we have tried to do in the very short descriptions which follow is to emphasise the salient points; sometimes it is the position, sometimes the physical features, sometimes it is the possession of minerals, sometimes the character of the inhabitants, which should be regarded as the really significant and important geographical feature of the country concerned. If we were setting out in detail the commercial geography of the country we might with advantage use the above headings or we can ignore the headings and take the facts in the right order and write our description in what is usually called essay form; the examination candidate can usually choose which he prefers. One word here to the general reader and to the student: suppose some country figures largely one morning in the news—run over the skeleton outline above and see how much is known about it. Under some headings we shall know quite a lot—under other headings there will be complete gaps. We shall at least know the gaps in our knowledge which ought to be filled.

## CHAPTER X

# The Commercial Geography of the Great Powers

Geography books usually deal systematically with one continent after another and with each country within the continent one after the other ; this is a very useful, proper and systematic method. We find, however, when we open our daily papers, that we are not concerned with the commercial geography, let us say, of western Europe, but we are concerned with France or Italy, as the case may be, as a great political unit. So in this book we shall retire from the usual practice and try and collect together the significant facts that relate to the great powers, and deal at a later stage with the smaller countries of the world ; under the great powers we shall consider their overseas dominions.

In what ways can we assess the relative importance of the major countries of the world ? We can do this from the point of view of size, but it is obviously possible for a country to include a great area of uninhabited and almost useless desert. Thus Italy has considerable areas of African territory under her control, but the use of these areas is limited. Again, Brazil and the United States cover almost the same area, but we could scarcely say that Brazil is as important as the United States. The same is true if we take population as a measure of relative importance—on this basis China comes out first and India second, followed by Russia and the United States. Whilst the volume or value of foreign trade is an important measure of the activity of a country, a great power may be almost self-contained and not *need* a huge foreign trade. Foreign trade is not, for example, as vital to the United States as it is to Britain.

Economists have devised a special technique for the measurement of the wealth and income of the great countries of the world and there is a considerable literature on the subject. On this basis we may say that there are seven great powers—five of them in Europe. The relative importance of them may fluctuate—at the present time they probably stand in the

order : British Empire, United States, Union of Socialist Soviet Republics (Russia), France, Germany, Italy and Japan.

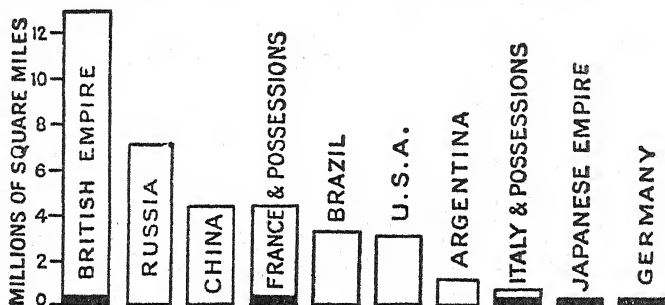


FIG. 63.—A comparison of the size of the chief countries of the world

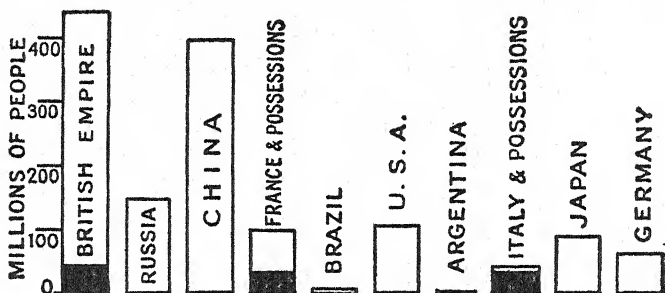


FIG. 64.—A comparison of the population of the chief countries of the world.

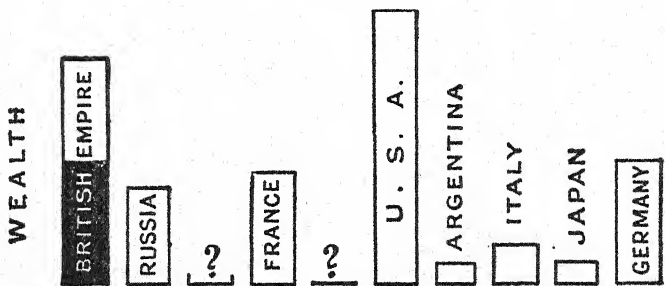


FIG. 65.—A comparison of the wealth of the chief countries of the world.

In the pages which follow we shall thus pay special attention to the commercial geography of the Great Powers.

## CHAPTER XI

### The United States of America

**General Considerations.**—We have chosen to consider first amongst the Great Powers the United States. The territory of the United States is a compact block of country and overseas possessions are few and small, so that a consideration of the commercial geography as a whole is very much simpler than is the case with an Empire such as the British Empire, consisting of scattered tracts in different parts of the world.

**Position and Size.**—The United States as constituted by the Declaration of Independence of July 4th, 1776, consisted of thirteen states on the eastern seaboard of North America which had previously been British Colonies. The independence of the United States was acknowledged by Great Britain in 1782, and the territory has been continuously extended, mainly by settlement and purchase, so that it now extends from the Atlantic to the Pacific Ocean and from the Canadian border on the north to the Mexican border on the south. The area of this continuous tract is over three million square miles and the Union is now divided into forty-eight states, each having its own constitution, the governor of each state being chosen by the direct vote of the people of the whole state. Of the overseas divisions the largest is Alaska, nearly three-quarters of a million square miles purchased from Russia, the Philippine Islands in the East Indies, received from Spain after the Spanish War and recently accorded provisional independence, and the Hawaiian Islands in the middle of the Pacific. Hawaii and Alaska are territories of which the governor is appointed by the President of the whole Republic. The three million square miles of the United States compare closely with the area of Australia, the area of the United States including Alaska closely with the area of the Dominion of Canada. The most significant points about the position of the United States are :

(a) The long seaboard on both the Atlantic and Pacific oceans.

(b) The situation wholly within the North Temperate zone, so that no part reaches the frozen deserts of northern polar regions, excepting of course the non-contiguous territory of Alaska, and no part of the United States is within the tropics.

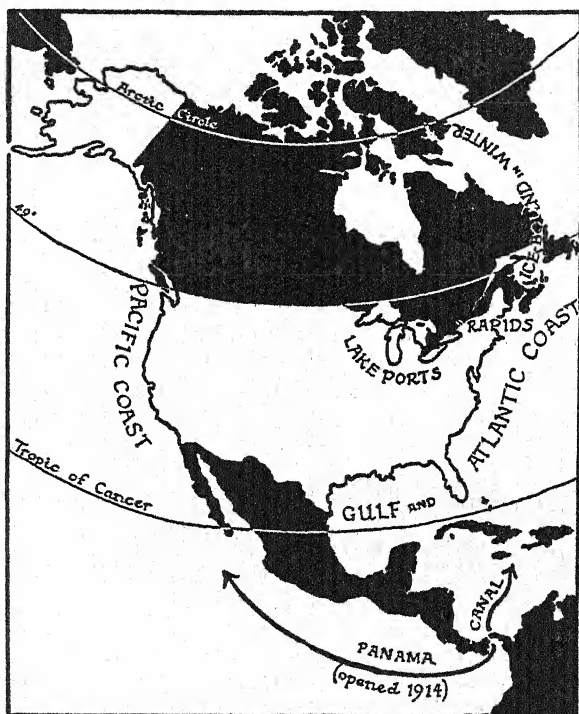


FIG. 66.—The accessibility of the United States.

Thus it is latitude  $49^{\circ}$  N. which forms the boundary with Canada for half the distance across the continent, whilst the southernmost tip of Florida is within a few degrees of the tropics.

(c) The United States is roughly 3,000 miles from east to west—from coast to coast; it is as far from New York to Los Angeles as it is from London to Canada, or from London to



Persia—it is even as far from New York to Chicago as it is from London to Vienna or from London to Madrid. Thus the great fight in the United States has been one against the disadvantages of distance, a conquest of distance.

As a result of its position the United States can never be independent of foreign supplies of equatorial products.

**Physical Features.**—The United States, in fact the whole of the continent of North America, falls very simply into three divisions :

- i. The Western Mountains or Rocky Mountain system.
- ii. The Central Plains.
- iii. The Eastern Highlands.

The *Western Mountain system* comprises at least three subdivisions :

(a) The Rocky Mountain system properly speaking, *i.e.* the Rocky Mountains and associated ranges. In the United States the mountains are separated into northern and southern halves by the Wyoming Basin.

(b) The Inter-Montane Plateaus, including the Columbia plateau, the Colorado plateau, and the Great Basin.

(c) The Pacific mountain system, comprising the Cascade and Sierra Nevada mountains and the Coast Range with the very important intervening valleys.

The *Central Plains* comprise several sub-divisions :

(a) The extension of the Laurentian Shield, so important in Canada, lies south and west of Lake Superior and is economically important as including the great iron mining areas of the United States.

(b) The interior plains correspond roughly with the interior grasslands, *i.e.* the mid-continent grasslands referred to in Chapter III, so that usually the land is flat or only gently undulating, but the Central Plains must *not* be thought of as lowland. A small part in the north drains towards Canada and Hudson Bay, but practically the whole of the Central Plains in the United States is in the basin of the great Mississippi River and its tributaries, including the Missouri.

(c) The Interior Highlands, or the Ozark Mountains, rise like a large oval island of old rock rich in minerals in the Central Plain.

(d) The Atlantic and Gulf Coast Plains border the Gulf of

Mexico and swing round the southern end of the Appalachian system to border the Atlantic.

The *Eastern Highlands* include the Appalachian system which occupies a large and very important area in the north-east. The Appalachians were once lofty and rugged mountains like the Alps or the Himalayas, but being much older they have been much more worn down. The mountains consist of a number of roughly parallel ridges running parallel to the Atlantic Coast, and this arrangement resulted in the mountains long

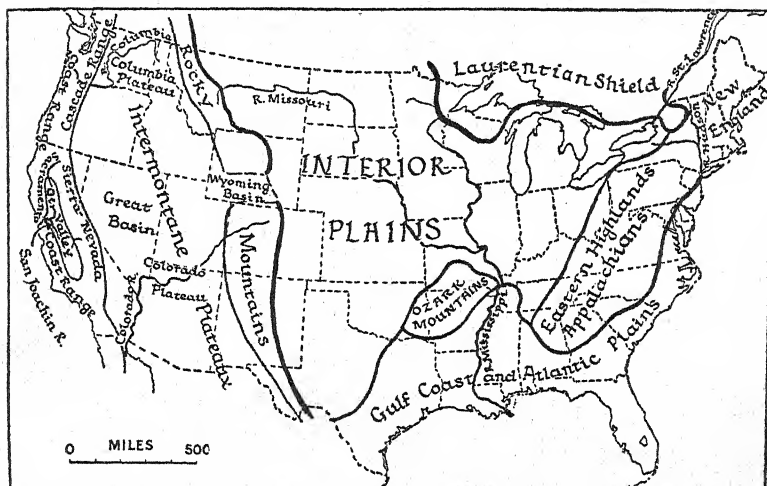


FIG. 67.—The physical regions of the United States.

acting as barriers against the spread of the early settlers from the New England States, and has indeed an important influence on communications even at the present day; every effort is made by rail and road to use the few natural gaps which have been carved by rivers.

Amongst the other physical features of the United States we should notice the river system. The main water parting is the main crest of the Rocky Mountains, from which a group of rivers flows westwards towards the Pacific Ocean. Amongst these are the Colorado, famous for its canyon, particularly important because it flows through very dry country and its

water is being extensively used for irrigation. The latter statement is also true of the shorter rivers of California, the Sacramento and the San Joaquin. Farther north the Columbia and its tributaries are used for irrigation in the interior and for navigation in their lower reaches. The rivers of the United States flowing eastwards from the Great Divide nearly all join the enormous Mississippi system, the river finding its mouth in the Gulf of Mexico by a southward course. This river was formerly much used for navigation, but the river flows on the

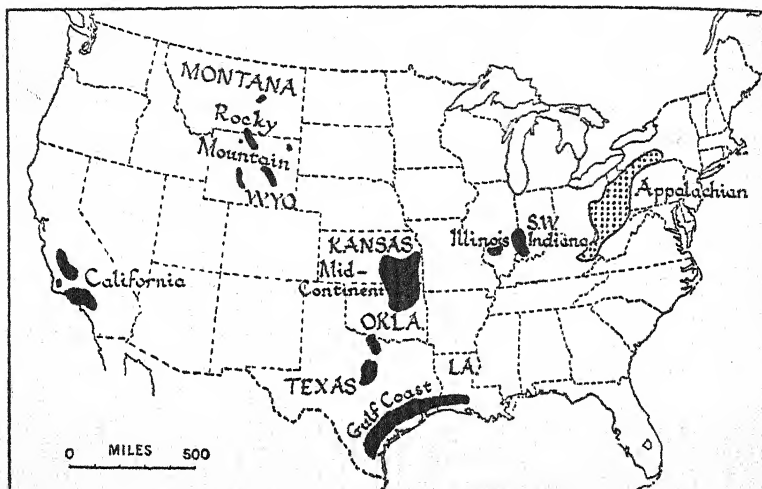


FIG. 68.—Oil fields of the United States.

whole from north to south, whilst the traffic needs of the United States are from east to west. Finally there are the important but comparatively short rivers which flow from the heart of the Appalachian system, cutting through some of its mountain ridges, to the Atlantic Ocean; of these the Hudson, forming a highway inland from New York, is the most important. From the commercial point of view we should distinguish amongst the rivers of the United States (a) their importance as highways, (b) sources of power, and (c) as sources of water for irrigation.

As highways in particular, the Great Lakes system, linking with the St. Lawrence in the north, must never be forgotten.

**Geology and Minerals.**—The main geological and structural units of the United States may be correlated very closely with the physical units. The Rocky Mountain system, like most of the great fold mountains of the world, is mainly of Alpine or Tertiary age, and it includes a great variety of rocks; there are numerous intrusive masses of igneous rock and extrusions of lava; many areas are highly mineralised. Amongst the more gently folded rocks of the slopes, notably in California and in the heart of the continent, lie many of the world's richest oil-fields. We should expect to find a variety of metallic minerals in the heart of the Rocky Mountain system, oilfields on its flanks—and this is the case. The Central Plains, with the exception of the fragment of the Laurentian Shield in the north-east and the Ozark Highlands, consist of sedimentary rocks but slightly folded. The rocks vary in age, and in some places contain important coal and oil fields. During the great Ice Age the whole of the north of the United States and most of Canada was covered by a great ice-sheet; when the ice retreated it left behind it over huge areas a great mantle of glacial drift, a fine-grained deposit, consisting of a variety of mineral fragments, and consequently very fertile. This is the soil which underlies the northern part of the Great Plains and renders them so particularly suitable for cultivation on a large scale. The Appalachian system is very complex and of much earlier date than the Rocky Mountains; ridges of ancient rock are exposed particularly in the north, where they constitute a large part of New England, but most important of all are the great coal basins of sedimentary rock, lying on the western side of the main folded mountains. We shall expect, then, to find associated with the Appalachian region certain deposits of metalliferous minerals and also the great coal basin.

Let us look at some of the more important minerals of the United States. Coal has already been discussed in Chapter VI; notice its relationship in occurrence to the structural units of the continent. Mineral oil has also been considered; again notice its relationship. The huge development of oil in recent years in the United States has called also for a specialised means of transport—pipe-lines, through which the oil is sent by means of pumps placed at intervals of 15 to 40 miles, connect the mid-continent and eastern fields with the Lake side industrial

regions and with the Atlantic coast. The Californian output is handled largely by oil tankers. Petroleum ranks first both in quantity and in value of the products passing through the Panama Canal; in other words, it is sent from the west to the

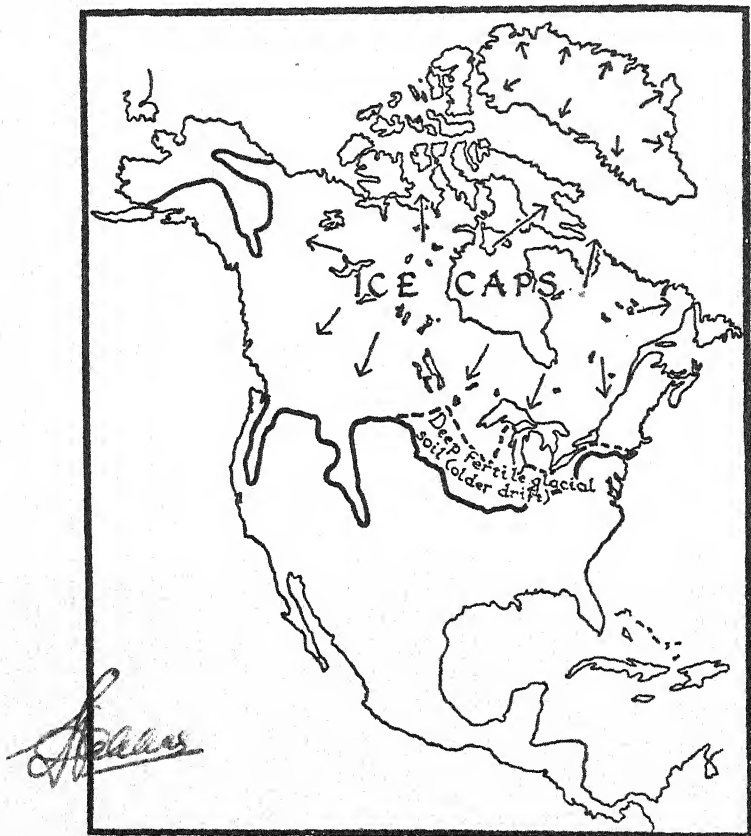


FIG. 69.—The glaciation of North America.

east coast of the United States by water. Natural gas occurs both in the oil territories and also by itself, particularly in the northern part of the Appalachian oilfield. Although much is wasted, the value of that which is used is greater than the value of the gold and silver production combined.

Of all the industries of the United States the production of iron and steel ranks as the most important. The great iron mines of Minnesota are not very far from Lake Superior, but are over a thousand miles from where the best coking coals are produced, in Pennsylvania. The seriousness of this distance is fortunately minimised by the presence of the Great Lakes :

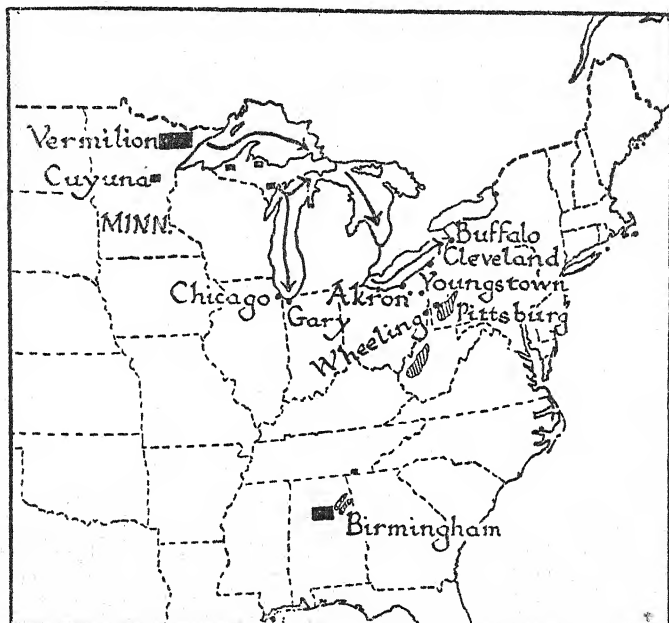


FIG. 70.—The iron industry of the United States.

The black squares show the sources of iron ore; the lined areas are the old sources on the coalfields. The arrows show the direction of movement of the ore.

nearly all the iron ore is moved eastwards towards the fuel, not only because the early use of local iron ore caused the smelting works to be established there, but because the markets for the products are mainly in the north-eastern states. Pittsburgh is still the leading steel-producing region, followed by the large towns by the side of Lake Erie and Lake Michigan. An important, distinct region is that around Birmingham (notice the connection of the name) on the southern Appalachian coalfield.

*Metalliferous Minerals.*—Look at the map showing the distribution of the metalliferous minerals and see how they are closely associated with the areas of old rock. Copper is mined amongst the Rocky Mountain plateaus and on the borders of Lake Superior; nearly all the gold, of which the United States is still a big producer, comes from the Rocky Mountain states; so too does the silver. Lead and zinc come largely from the Ozarks—that little island of old rock in the heart of the continent, and also from a famous mine in the east. The United States

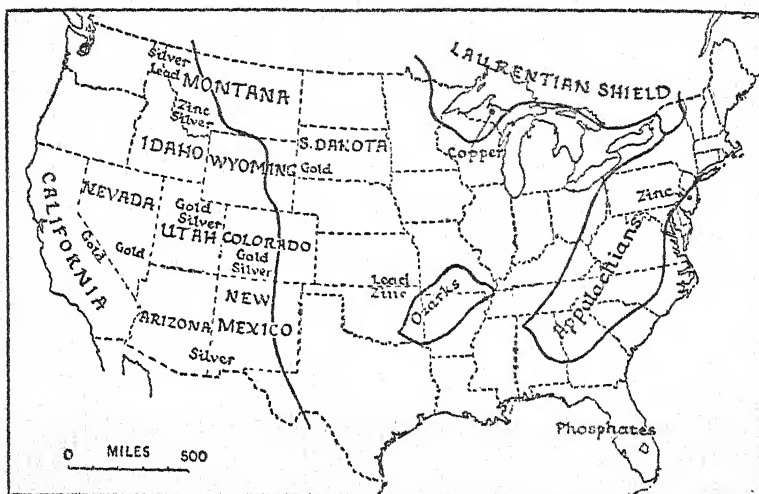


FIG. 71.—Metalliferous minerals of the United States.

is also a leading producer of aluminium; it is extracted from its ore by means of hydro-electric furnaces. Of the important minerals in which the United States is deficient, the one to be noticed is tin; others include nickel, chromium and manganese, which are frequently used in the steel industry. Other mineral deposits are widely worked, *e.g.* clay for the manufacture of clay products, including bricks and tiles; limestone for portland cement; salt, as well as phosphates for manure, especially in Florida.

*Climate.*—Two physical factors of paramount importance

influence the climate of North America, including the United States. One is the north and south alignment of the Rocky Mountain system, which provides a remarkable and almost complete barrier to the penetration of the westerly winds. On the other side of the continent the Appalachian system acts to a small degree in the same way so far as easterly winds are concerned. The other is the absence of any east-to-west barrier, so that the Central Plains in winter are open to the full influence of Arctic conditions from the north, whilst in summer they are open

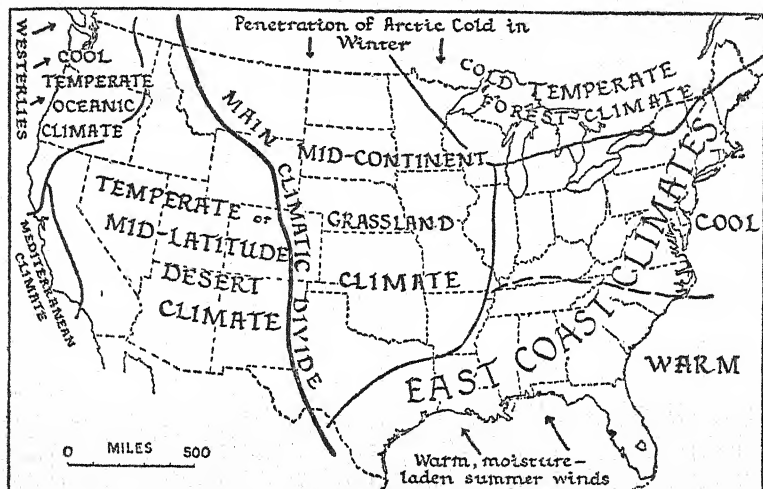


FIG. 72.—The climatic regions of North America.

to the rain-bearing winds from the Gulf of Mexico. These two factors together account for the tremendous range of temperature found in the heart of the United States. In a large part of the plains the temperatures fall to below zero, for a certain period at any rate, in every year, and most towns in the United States experience temperatures of over 100° F. in the summer.

Now let us see how the United States stand in relationship to the major climatic regions of the world. In the heart of the continent is a large triangular area, enjoying what we have described as the mid-continent or mid-latitude grassland climate. Between this area and the Atlantic coast is a region with an



east coast climate, warm in the south, but, on the whole, colder in the north. Both areas are characterised by considerable differences between summer and winter; in the south the summers are warm enough for such sub-tropical crops as cotton and maize. On the west of the central triangular area is a large tract amongst the Rocky Mountains, hemmed in by mountains, where the penetration of rain-bearing winds is hindered, and where we find temperate deserts and semi-deserts and much of the land, if it is to be utilised, must be irrigated. But in the north-west, in the coastal states of northern California, Oregon and Washington, there is a tract which enjoys a climate comparable with that of the British Isles, the cool temperate oceanic climate with mild winters but comparatively cool summers. South of this, occupying the southern two-thirds of the state of California, is the important, famous region with a Mediterranean type of climate and which consequently produces movies, talkies and Mediterranean fruits.

**Natural Vegetation.**—This, of course, corresponds very closely with the distribution of the climatic types. We have the mid-latitude grassland tract, the Prairies, in the centre, whilst to the east are forest regions. The forests of the south-eastern province are largely quick-growing pines, but include a considerable variety of forest in the low-lying swampy lands bordering the main rivers. This gives place northwards to a hard-wood forest, largely of deciduous trees, but in the extreme north, along the Canadian border, are large tracts of the soft-wooded coniferous trees comparable with similar tracts in Canada. Turning to the west, there are vast areas covered by brush and semi-desert vegetation, with a scrub forest on the hills but good forests on the mountains where they can benefit from an increased rainfall or from snowfall. Very fine forests indeed occur in the north-western region where one finds the famous redwoods—the oldest living things in the world and also some of the largest; if not the largest, trees in the world. The diagram shows the proportion in the United States occupied by forest, grassland and desert.

When the early settlers arrived in the United States the natural vegetation was regarded largely as an enemy; the forests of the east, consisting for the most part of hard wood, had to be laboriously cleared so that crops could be grown on

the soil. At a later date when the settlers reached the prairies, their great idea was utilising them by ploughing and cultivating their wheat and their other crops. The huge forests of soft wood were looked upon as inexhaustible supplies of lumber and building timber, but it must be recorded that now the valuable timber has been removed over a very large proportion of the United States. There were formerly four important areas of soft wood :

- i. New England.
- ii. The Lake states, both of which areas now consume more than they produce except for a small area in Maine, in the extreme north-east.
- iii. The Gulf states, which now supply the very fine soft timber, yellow pine and pitch pine.
- iv. The Pacific states in the north-west which now have the largest reserves, especially of Douglas fir, western white pine, western yellow pine and redwood.

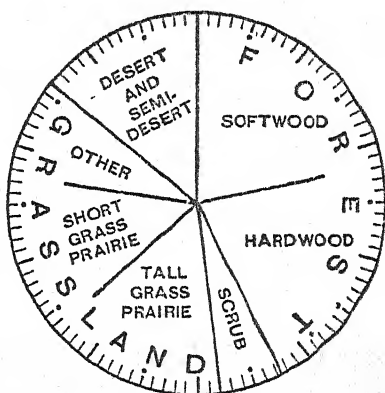


FIG. 73.—The surface of the United States.

Despite the enormous area of forest, however, the United States is no longer self-supporting as far as wood-pulp and paper is concerned, and has to import from her neighbour, Canada. In the east the hardwood forests were once important for their yield of timber for furniture making and for the manufacture of agricultural implements, vehicles, etc. Deal has largely replaced hardwood, but the manufacturing industries remain in the old centres. We will deal later with the agriculture of the United States.

**Animal Life.**—The chief point to be noticed here is first to remove the popular conception remaining in parts of England that the North American prairies are still the haunt of bison

and buffalo ; they are not. Wild animals, as far as the United States are concerned, are not important in the life of the country, unless it is the tame bears in Yellowstone Park and the attraction they offer to large numbers of tourists who spend money crossing the continent in order to see them.

We may mention the fisheries, however, since the United States fisheries are probably more valuable than those of any other country. The Atlantic fisheries are most important—on the New England and North Atlantic coast ; inshore fish include shad, used as a source of oil, and benito, not known on the other side of the Atlantic ; deep-sea fish include the familiar cod, hake and halibut. Crabs and lobsters are caught in large numbers along the coast, whilst this region can yield more oysters than any other part of the world, particularly fine ones too, which are sold more cheaply in the United States than are oysters in Britain. The inland fisheries are of relatively small importance ; the once teeming multitudes in the Great Lakes were gradually exterminated by over-fishing. At first they were caught in such large quantities they were spread on the ground for manure ; the present generation is paying the penalty for this foolishness of the pioneers. The famous "clams," of which American citizens are enormously fond, are obtained in the upper Mississippi and some of its tributaries. The Pacific fisheries centre around Alaska, Puget Sound and the Columbia river. Fish hatcheries supply enormous numbers of tiny fish for the streams, otherwise the number of salmon would be rapidly depleted when one remembers that the annual catch yields 200,000 tons of tinned fish alone.

### Man in the United States

**The People of the United States.**—We are all familiar with the fact that the people of the United States speak English and are responsible for many of the enrichments of the English language. We vaguely connect this with the British origin of the Pilgrim Fathers. It will be as well, however, to review very briefly the progress of colonisation in North America.

The New England States, that is roughly the area along the coast from New York northwards, were the scene of the early activities of the Pilgrim Fathers who first went over in numbers

to settle in 1620, in that famous ship the *Mayflower*. These pioneers were for the most part of the yeoman stock of this country, sturdy, independent merchants and farmers of Puritan outlook, searching for freedom in both work and religion in a new land. They formed the most important nucleus in the United States. Farther south, however, the State of Virginia is a colony originally founded by Sir Francis Drake and named in honour of Elizabeth, Virgin Queen of England. It was not really colonised until later, in James I's reign, and it was a venture of, and grew in association with, rather the cavalier element of Britain, the country gentlemen who looked for opportunity of money making and expansion in the new country. In the warmer climate of Virginia and the states to the south the gentry needed servants and labourers—and later became slave owners. There are now 12,000,000 negroes in the United States, descendants of African slaves, mainly in the south-eastern states. During the civil war in England Virginia did not come to blows with the New England states for the simple reason that they were separated by what was then a great distance. Nearby is Maryland, which suggests an association with Queen Mary, England's Catholic queen, and so with Catholics. In between is Pennsylvania, which takes its name from William Penn, the Quaker, the religion of whose settlers shortly afterwards attracted large numbers of other settlers of Lutheran faith from Germany. The Germans were "Deutsch," which has become corrupted to Dutch, and their descendants are known to this day as the Pennsylvanian Dutch. Between the southern and northern groups of British colonists we must not forget the early stronghold of the Dutch settlers, particularly around New Amsterdam, which has become the New York of to-day. There are many Dutch names amongst the famous families of the United States at the moment, just as there were in the early days among the signatories of the Declaration of Independence.

Farther south along the Atlantic coast the Carolinas take their name from Carolus, or Charles, of France and are reminders of early attempts of French settlement, which, however, were soon taken over by the British. Georgia rightly suggests an association with George I, King of England, a settlement of a later date, and an alternative to prison for the benefit of debtors

in this country. Florida was an early Spanish settlement; the architecture of many towns in Florida bears witness to Spanish influence even to this day. Meanwhile the French, not so much settlers as soldiers, explorers and missionaries, had penetrated the North American continent up the St. Lawrence River and through the Great Lakes to where Chicago now stands, and up the Mississippi and across the Central Plains to meet their fellows from the north. The French claimed practically the whole of the interior of the United States, but Napoleon handed it over to the young Republic, when he was badly in need of funds, so as the result of the "Louisiana Purchase," as it was called, this territory, originally opened up by the French, became part of the United States.

At a very early date indeed the Spaniards, particularly the Spanish missionaries of Central America and Mexico, had penetrated northwards into the semi-desert regions of what are now New Mexico and Arizona, and particularly into California as far north at least as San Francisco. The very names, Los Angeles, Santa Barbara, San Francisco, and many others in California are reminders of this early association with Spain and Mexico.

Thus it will be seen that the centres of English origin were more or less confined to the Atlantic seaboard; they were hemmed in there by the Appalachian Mountains and the difficulties of crossing them. When the routeways afforded by the Hudson and the other rivers became fully appreciated, but not till then, the great westward movement began. How late this great movement was we can appreciate when we think that the great city of Chicago was only founded in 1832; a small settlement of log huts was the humble origin of Fort Dearborn, afterwards to become Chicago. From that time onwards the Eldorado remained ever westwards. We have all sung "Lived a miner, forty-niner, and his daughter Clementine," but do not perhaps associate it with the great Gold Rush of 1849 which made California famous, and acted as a magnet, drawing untold numbers of human beings across the 3,000 miles of the North American continent. Some fell by the way, others settled by the way, but the magnet was sufficient to stir the whole of Europe. The immigrants came especially from the old countries of northern Europe or from Italy and Spain—

Germans, Poles, Italians, Scandinavians, Spanish, all sent their quota. Some could give the new country ideas and ideals which have persisted, but all could learn to speak the new language, English, and to become absorbed in a remarkably short space of time into the new nation. In brief, we have thus the origin of the United States nation, as yet having very different elements and scarcely welded into one whole.

**Distribution of Population.**—The present distribution of population in the United States is determined by two principal factors :

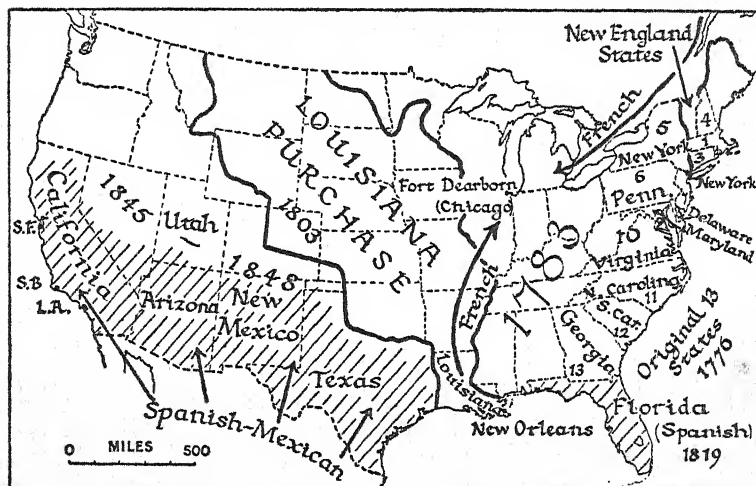


FIG. 74.—The United States, politico-historical.

- (a) Climatic and other conditions conducive to settlement.
- (b) The history of colonisation and settlement.

There are very few parts in the United States to-day which are not supporting a considerable population ; in quite a number of areas the pioneer has tried too hard to battle against nature—he has passed beyond the area where his labour will be repaid in crops or in other ways ; the pioneer fringe, in other words, is being driven back. There are no great stretches of land in the United States to-day awaiting the pioneer and the settler. What is needed at the present day is a consolidation and a

better understanding of the utilisation of the land already occupied. Thus we find in general that the distribution of the population gives a very clear index as to the suitability of the area for supporting human beings.

The urban development, too, is due in large measure to the position of coalfields and the possibilities of industrialisation. But the historical factors have assured that there should be rather an overwhelming prominence still of the East. Thus there are many large cities in the New England States which are not, really, particularly well situated either for manufac-

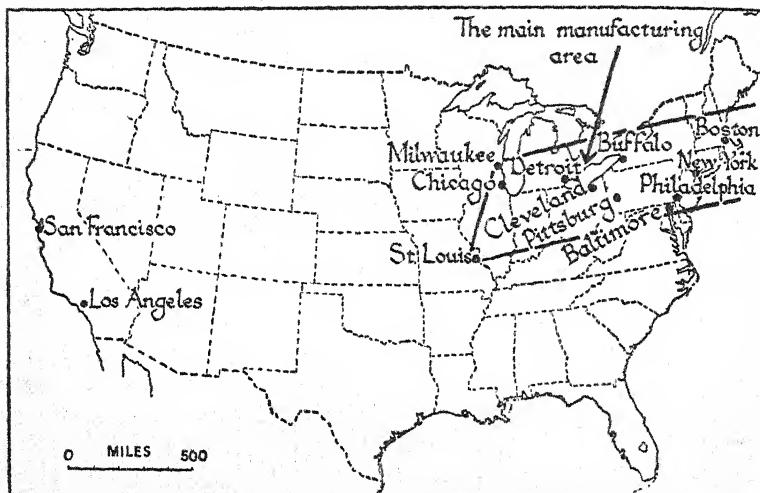


FIG. 75.—Cities of the United States.

tures or for other purposes, but which are early settlements and which have grown accordingly. They are having a hard struggle to maintain their pre-eminence against their younger rivals, for the most part farther west, which have greater advantages from the point of view of position and resources. Notice in the diagram how the majority of the large cities in the United States are still to be found in roughly a rectangular area in the north-east of the continent.

**Occupations of the People.—Rural Occupations.**—Despite the importance of its manufactures, the United States is still largely



an agricultural country. In a broad general way the country may be divided up into a number of agricultural belts to which reference is commonly made in ordinary speech. The rainfall line of 20 inches per year cuts the United States roughly into two halves. Nine-tenths of the arable land lies to the east, the wetter, side of this line. To the east of the line, from south to north, there are five agricultural belts, as shown in Fig. 76.

- i. In the south the sub-tropical coast belt with its sugar and rice.

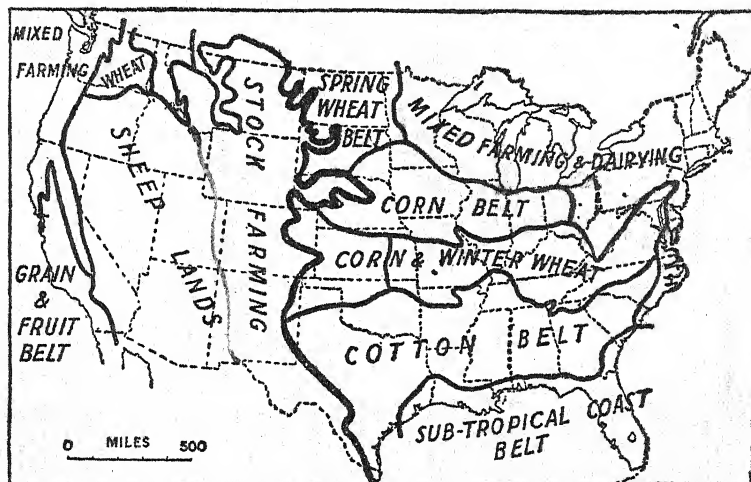


FIG. 76.—The agricultural regions of the United States.

- ii. The great cotton belt, producing two-thirds of the world's cotton.
- iii. The corn and winter wheat belt.
- iv. The corn belt, centring on Chicago.
- v. The spring wheat belt of the north-west, continuous with the great spring wheat belt of Canada, and the mixed dairy farming belt of the north-east.

To the west of the line lie :

- i. The stock-farming country of the Great Plains or short-grass prairies, where it is too dry for efficient agriculture and where there is land lying beyond the pioneer fringe where the rough vegetation can be used for pasture



for a limited number of stock. From these poor stock-lands the animals are usually sent to the corn belt for fattening.

- ii. The sheep lands of the Inter-montane plateaus.
- iii. The grain and fruit belt of the wetter plateaus and of the Pacific coast.

These divisions are extremely important and their position should be very carefully studied. The map, Fig. 76, shows the distinction between the spring wheat and the winter wheat areas of the United States. Wheats which are grown in a drier climate are usually hard, have a high percentage of gluten and

make the lightest bread; many of the spring wheats are of this type; but hard winter wheats also grow in the drier belts as far south as Texas. The United States has an enormous annual production of wheat; until recently about a fifth of the output was available for export, but this proportion is steadily diminishing.

Corn or maize is the largest cereal crop in the United States, and the diagram, Fig. 77, shows the use which is made of it. About 85 per

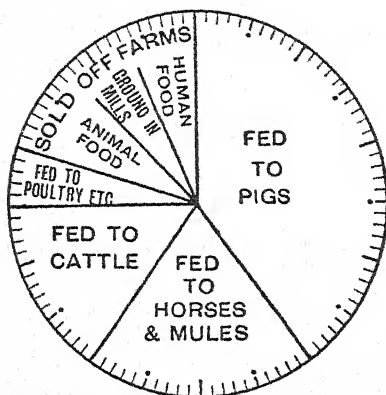


FIG. 77.—The utilisation of the maize crop.

cent. is actually consumed on the farm; in other words, it goes to the factories "on the hoof," the corn being fed to pigs, cattle, horses, poultry and sheep. The importance of the crop is seen in relation to the meat industry, and the corn belt of the United States is also the centre of the pig population, and has been well described as a land of cylindrical hogs and cubical cows.

Amongst the interesting special crops of the United States we may mention rice, which is now grown along the sub-tropical Gulf coast and on irrigated land in California. Sugar-cane can also be grown in the sub-tropical belt but is important only in Louisiana, and enormous quantities of sugar are imported.

The growing of fruit, particularly of citrus fruit, is a highly organised and very successful industry in California and Florida. Because of the sensitiveness to frost the production is practically limited to these two states and to Arizona. Oranges grow in the two areas and so also do grapefruit. Various Mediterranean fruits flourish in California especially in the dry, sunny, irrigated lands of the Great Valley and the drying and canning of the fruit are industries of first-class importance. Temperate fruits—apples—are particularly important in the region of the Great Lakes and the state of Washington, adjoining British Columbia.

The United States grows about a third of the world's tobacco. The crop is especially localised in the states of North Carolina, Kentucky, Tennessee, Virginia, and South Carolina, the area where the negro population is so important.

Market gardening, or truck farming, is conducted mainly in the vicinities of large cities which form markets for the products, particularly along the Atlantic coast in the north-east. The American is a great user of canned produce and the canning of vegetables is an important outlet for much of the produce of the farmer.

Coming to the domestic animals of the United States, there are two areas of first-class importance in the rearing of beef cattle. First are the Great Plains to the west and amongst the mountains, where large herds of cattle are allowed to range over wide tracts. They need comparatively little care, but are indifferent beasts. The usual practice is to ship them to the farms of the corn belt, where they are fattened on corn before being sent to the slaughtering and meat-packing works. In the second place many cattle are reared in the corn belt itself. With regard to dairy farming, this occupation is widely diffused, if only for the necessity for fresh milk in all the large centres, but there is a marked concentration in the cooler lands in the north-east, where Wisconsin makes two-thirds of the cheese made in the United States and where in the Lake states in the north-east are the great butter-producing areas.

Pigs are of very great importance in the United States, the majority being found in the eastern half of the Republic, and more than half of the total in the corn belt, where they consume 30 per cent. of the enormous maize crop of the country.

Sheep, on the other hand, are found mainly in the dry western half of the United States. The consumption of mutton is small in the United States, the sheep being reared mainly for wool, and the wool which they yield is not sufficient for home requirements.

In the value of products, slaughtering and meat packing is the most important of all the industries in the United States. The development of cold storage and the use of refrigerator cars has enabled the industry to be concentrated in a small number of cities, notably in Chicago, St. Paul, Kansas City, Omaha and other cities of the central states.

**Manufactures.**—Although in the value of goods manufactured the United States ranks first amongst the countries of the world, the country is not essentially an industrial one in the same way that Great Britain is. Amongst the factors which produced the very rapid rise in manufacture may be mentioned the abundance of easily exploited fields of good coal conveniently situated, the abundance of iron and other metals and raw material generally, and the large home market afforded by the population of 123 million people. The early settlers naturally sought to establish the industries of their home countries, and the New England states became thus the centre of woollen manufactures, wood, metal and leather working. Manufactures, like cultivation and settlement, moved westwards, and the main manufacturing area now stretches from New England to Chicago and St. Louis in the west. The leading manufacturing cities, according to the census of 1920, are New York City, Chicago, Philadelphia, Detroit, Cleveland, St. Louis, Baltimore, Boston, Buffalo and Pittsburg.

Amongst the leading industries we may note the following :

**Food Industries.**—Most of these are concerned with the preparation of the home-produced raw materials of the farms. In the value of products slaughtering and meat packing is the leading industry of all. The popularity of "canned" foods is evidenced by the fact that 100,000 people are employed in canning fruit and vegetables alone—an industry associated with the bright sunny land of California or the intensive agricultural regions of the East Coast.

**Textile Industries.**—There is great rivalry between the old cotton towns of New England—towns such as Fall River, Lowell and New Bedford—and the newer centres in the Cotton

Belt itself. The woollen, silk, rayon and clothing industries tend to remain in the north-east—in New England, in New York State and neighbouring areas.

*Metal Industries.*—The iron and steel industry has already been considered: industries using the products include ship-building—relatively much less important than in Britain; vehicles (with the great motor centre at Detroit); machinery on the Pittsburg coalfield area and in the eastern towns. The need for railway repair shops has given rise to widely scattered industrial centres (compare, on a smaller scale, Britain).

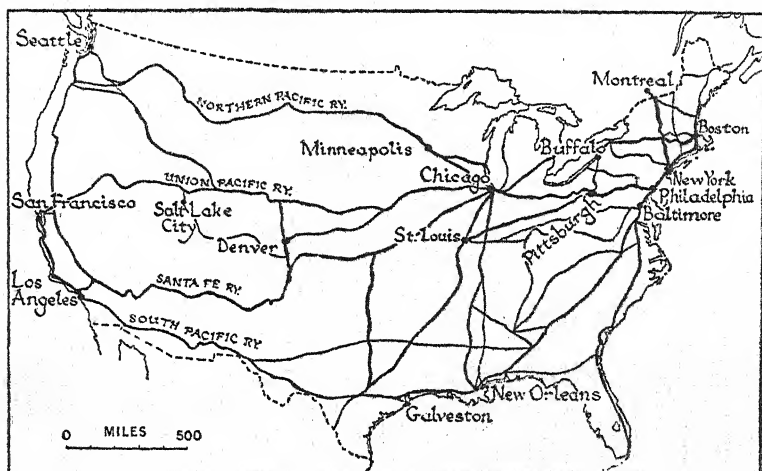


FIG. 78.—The Railways and Ports of the United States.

*Miscellaneous Industries.*—Amongst these, of special interest may be noted the motion-picture industry of Los Angeles, which owes not a little (or did) to climatic conditions.

*Communications.*—The United States has over a quarter of a million miles of railway—more than all Europe—and a third of the world's total. The English standard gauge is used throughout, so that British locomotives can run on American lines. An almost incredible change has taken place in the American road system as a result of the use of reinforced concrete. The United States has now a million miles of concrete roads. American waterways are of much smaller importance

than formerly, though the Great Lakes system is of outstanding importance. Notice what would be the effect of deepening the St. Lawrence to form a ship canal—ocean liners would be able to penetrate direct to Chicago.

The United States is like Britain in that the few leading ports handle most of the foreign trade. Since the Panama Canal was

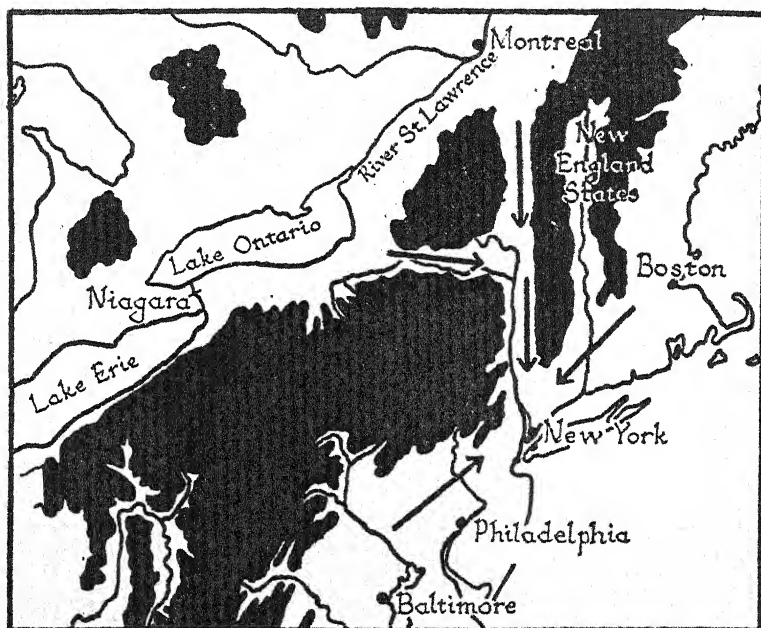


Fig. 79.—Sketch map showing the position of New York. The high land, shown in black, is broken by only one complete gap, that of the Hudson and Mohawk rivers behind New York.

opened in 1914 the Pacific coast ports have leapt ahead. Before this they handled only 6 per cent. of the foreign trade by value; now they handle 12 per cent. New York—notice from Fig. 79 the significance of its *position*—is still the great port with 40 per cent. of the total trade of the country. Note the other chief ports, from Fig. 78.

**Foreign Trade.**—In a country as vast as the United States and covering such a variety of regions, it is inevitable that

there should be a huge *internal* trade. So that although the area and resources of the country can be compared with the

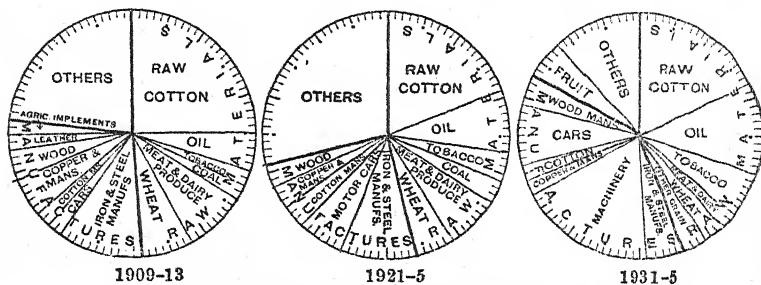


FIG. 80.—The exports of the United States.

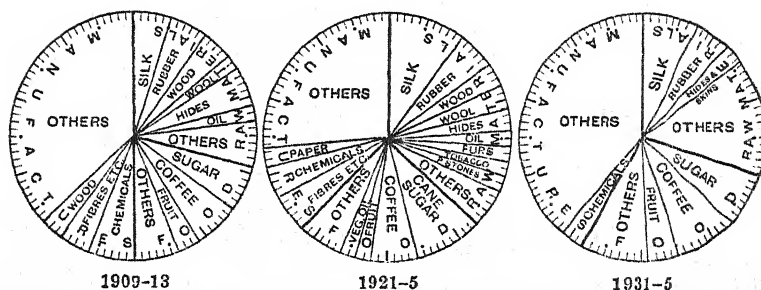


FIG. 81.—The imports of the United States.

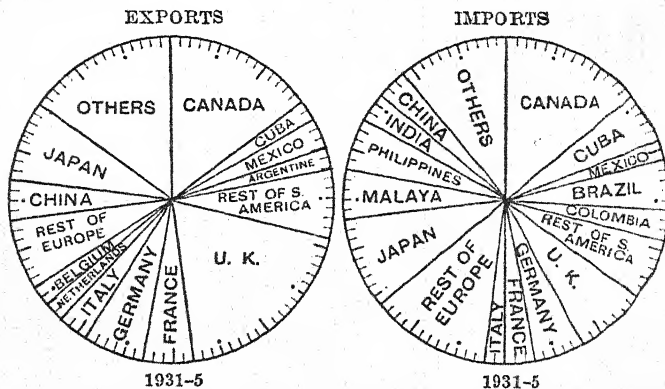


FIG. 82.—The direction of the foreign trade of the United States.

*whole* of Europe, the *foreign* trade is still slightly less than that of the British Isles. The United States is still a "young" country and raw materials and foodstuffs—primary production—lead amongst the exports, but every year manufactured goods take a higher place. The imports fall into three classes :

(a) Products of tropical and equatorial regions which cannot be produced at home—or cannot be produced economically. These include rubber, coffee, sugar, tea, silk, tropical fruits (bananas), spices and cabinet woods.

(b) Manufactures of high grade—especially from Europe.

(c) Minerals in which the country is deficient, notably tin. There are now some items, such as wood, wood pulp and paper, representing commodities of which the home supply is becoming exhausted.

The foreign trade of the United States is extraordinarily widely distributed amongst the countries of the world, as the diagrams make clear (Fig. 82).

## CHAPTER XII.

### Russia

**General Considerations.**—It seems useful to deal with Russia next after the United States of America, for like that country it is a continuous mass of land. There are no overseas possessions, so that, vast as is the area of the Union of Socialist Soviet Republics, the commercial geography as a whole is comparatively simple.

**Position and Size.**—During the hundred years which preceded the Great War the Russian Empire had steadily expanded from Europe right across the north of Asia to the Pacific coast, and southwards to the mountainous borders of Afghanistan and Persia so as to include what is now Russian Turkistan. In October, 1917, came the Bolshevik Revolution and the overthrow of the Czarist régime; in the subsequent settlement Finland became independent, the three small Baltic states of Estonia, Latvia and Lithuania were carved out of what was formerly the Russian Empire and a further tract of country on the western margin became part of the new state of Poland. But there remains within the confines of present-day Russia an area of over  $8\frac{1}{2}$  million square miles with a population approaching 170 million. We have spoken of the great fight of the United States to conquer distance, yet Russia is an area nearly three times as large; over 5,000 miles from east to west, and in places nearly 3,000 miles from the borders of the Arctic Ocean in the north to the southern frontier. It is ten days' continuous journey in one train from Moscow to Vladivostok; it is three days' continuous journey from Moscow to the southern frontier of European Russia, and nearly two days' journey from Moscow to the northern shores.

If we look at the position of Russia on the globe we notice at once that not only is the whole in the Northern Hemisphere, but even the southernmost part does not reach the Tropics.



Russia lies entirely in mid-latitudes in the so-called Temperate Zone and in the Arctic Zone; no part of the country is tropical. Russian Central Asia, it is true, has extremely hot summers, and given irrigation can grow tropical and sub-tropical crops; hence the great importance of this area to the country as a whole. Because it does not possess land in equatorial or tropical latitudes one might say that Russia could never be economically self-sufficient; on the other hand, with its enormous home resources, its enormous compact mass of land and the nature

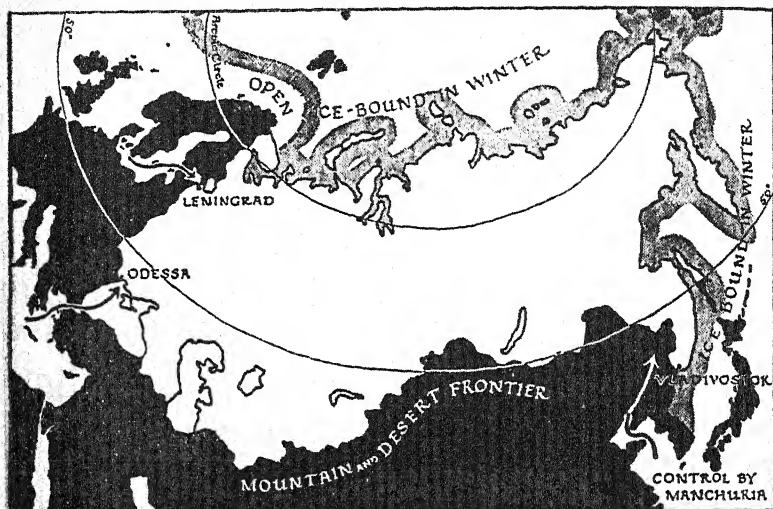


FIG. 83.—The frontiers of Russia.

of its frontiers, which do not encourage foreign trade, Russia is peculiarly designed to be by nature a self-contained unit.

On the north it is bounded by the Arctic Ocean, along which it has a very long coast-line, but the whole of this is ice-bound in the winter and a sea passage along the northern coast is only possible for two or three weeks in the middle of summer, if at all. Similarly the very remote Pacific coast of Russia, in the Far East, is ice-bound in winter. Across Asia Russia borders Manchuria, the desert wastes of Mongolia and the heart of Asia with their ramparts of mountains. In the south Russia is bounded by the mountain rampart of Afghanistan, Persia and

Turkey ; its coast-line along the Black Sea is valuable, but this is an inland sea, the entrance to which is controlled by Turkey at the Bosphorus and the Dardanelles. On the west Russia is bordered by Rumania, Poland, the three small Baltic countries and Finland ; it has a tiny fragment of sea coast in the neighbourhood of Leningrad, but the gulf on which Leningrad stands is itself controlled by Finland on the north and Estonia on the south and opens only to the enclosed Baltic Sea. Curiously enough, it is only in the extreme north-western corner of this vast country in the Arctic town of Murmansk that Russia has direct outlet to the open ocean.

**Physical Features.**—In the broadest possible way the whole of Russia is one vast, incredibly extensive plain ; only in the far north-east does this cease to be true or as one approaches the mountainous south-eastern and southern borders. Although the scenery changes from boggy arctic wastes through great forests of firs and other conifers to the rolling grain lands and then to the sandy uninhabited deserts, a journey in almost any direction across Russia can scarcely be described as other than monotonous. We may say, however, that the country falls into the following large divisions :

(a) *The Plain of European Russia* or the Russian Platform, occupying practically the whole of European Russia from the Arctic Ocean to the Black Sea, to the Caucasus and the Caspian Sea. Two-thirds of this great area lie within the basin of the river Volga, which is the longest river in Europe yet with its source in the Valdai Hills, only a few hundred feet above sea-level.

(b) *The Caucasus and Trans-Caucasia.*—In the southern part of European Russia, stretching as a rampart between the Black and the Caspian Seas, is the great line of the Caucasus Mountains, rising in places to over 10,000 feet. The Caucasus form such a barrier that they are still uncrossed by railway and only crossed by one motor road. The two railways find their way round either end of the mountain chain. The three small countries of Georgia, Armenia and Azerbaijan lie beyond the Caucasus (Trans-Caucasia) and are now separate socialist republics within the Union. A western extension of the Caucasus Mountains passes through the mountainous peninsula of the Crimea.

(c) *The West Siberian Lowlands*.—This tract of very low, flat country which forms the western part of Siberia is separated from Russia in Europe only by the low rise of the Urals, which can scarcely be called the Ural "Mountains" and offer little or no barrier to communications.

(d) *Central Asiatic Russia* or *Eastern Siberia* is on the whole a low, undulating plateau.

(e) *The Far East*, a very remote region of Russia, differs

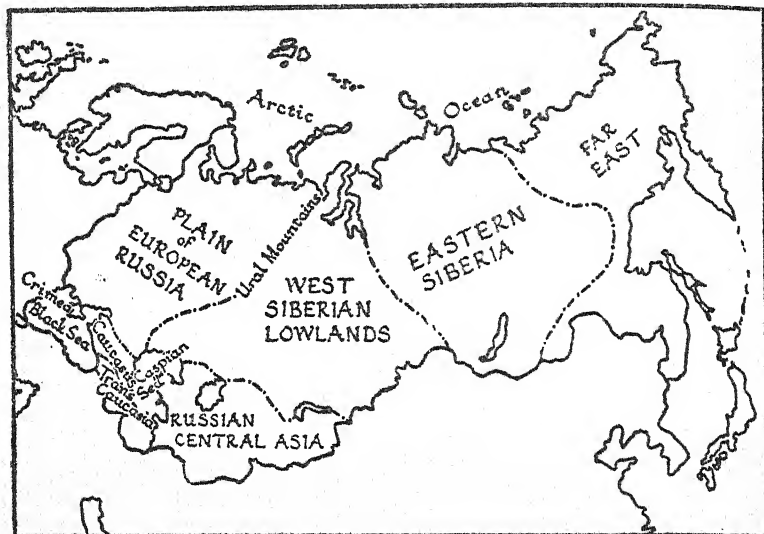


FIG. 84.—The physical regions of Russia.

from the remainder in that it consists of a succession of mountain chains, some of them still scarcely explored.

(f) *Russian Central Asia*, beyond the Caspian Sea, consists on the whole of a great desert basin, the Turanian basin, bordered by mountains on the south and east, and rising in the north to a low, undulating steppeland which separates Russian Central Asia from Siberia.

Such a land of extensive rolling plains is naturally a land of large, slow, meandering rivers ; but Russia is not very fortunate with regard to its rivers. Siberia is drained almost entirely to the Arctic Ocean in the north by the Ob, the Yenesei and the

Lena, and only in the far east does the Amur and its tributaries flow to the open Pacific; thus the Siberian rivers lead to the frozen Arctic and their lower courses are frozen for many months of the year. Similarly in the northern part of European Russia, the Petchora and the Dwina drain to the Arctic. Russian Central Asia is a land of inland drainage, and so too is all that huge territory drained by the Volga into the Caspian Sea. Those valuable rivers the Don and the Dnieper drain to the Black Sea, and so does the Dniester which forms the boundary between

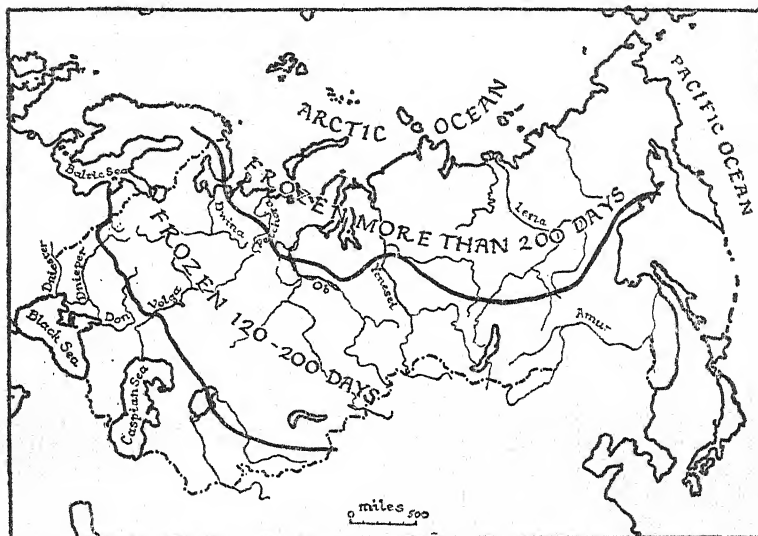


FIG. 85.—The rivers of Russia.

Russia and Rumania. The river Western Dwina passes through Latvia before reaching the Baltic Sea. Despite the fact that they are all frozen for many months of the year, Russia is making considerable use of her rivers, and reference will be made to the waterways in a later section.

From the point of view of railway and road construction, the rivers form the principal obstructions to through communication across this great plain and necessitate numerous and very large bridges.

**Geology and Minerals.**—Russia vies with the United States

in the richness and variety of its mineral resources. We may consider the country structurally in divisions closely corresponding with those just mentioned.

(a) *The Russian Platform or the Plain of European Russia.*—The term “platform” suggests to one the essential structure of this great tract. There is an underlying block of very ancient rocks belonging in their formation to an early period in the earth’s history; this solid block has resisted later earth-building or mountain-building movements, and instead has been subjected to movements of elevation and depression. In times of depression it has been covered by the sea or by large bodies of fresh water which have left on its surface layers of mud, sand and other deposits—to-day remaining as horizontal beds or beds but very slightly folded. In places, particularly along the north, the ancient rocks of the underlying block crop out, but over the central and southern regions they are covered by the later deposits. Fortunately the later deposits include in places coalfields, so that European Russia has three great coal basins. There is one in the extreme north-east in the Arctic region, not yet exploited; there is one consisting of brown coal lying to the south of Moscow and known as the Moscow basin; the third, and by far the most important, is the one known as the Don or the Donetsk basin in the south, not far from the Black Sea. Associated with the very ancient rocks, which are exposed in the north, are the minerals now being exploited in the Kola peninsula—iron, nickel, and apatite, from which phosphates for manure are made. In the south, near the Black Sea, there are enormous deposits of iron ore, so that Russia ranks second to the United States in its production of iron and steel. In a very late period of its geological history the whole of the northern part of European Russia was covered by a great ice-sheet which, on melting, was found to have scooped out hollows in the surface of the plateau. Some of these hollows are now occupied by lakes, others by marshy tracts or bogs, some of which are yielding peat. Further south ridges of sand and gravel run across the country and mark successive stages in the retreat of the ice-sheet and are actually terminal moraines. Beyond this, over central and southern Russia, are vast tracts which are covered by wind-borne deposits laid down by the very cold winds of the glacial period and which are the dust-like loess.

It is because of the existence of this fertile soil that so much of Russia is extremely fertile as agricultural land.

(b) *The Caucasus and Trans-Caucasia*.—The Caucasus is a typical folded mountain chain, with old rocks exposed in the centre yielding their quota of metallic minerals, including lead and zinc in the north, iron, manganese, copper and aluminium on the southern flanks. Similar minerals are yielded along the southern border of Russia. Just as on the flanks of the Rocky Mountains of North America we find the great oilfields of the United States, so on the flanks of the Caucasus we find the famous oilfields of Russia. The most important are to the south of the mountains, around the eastern end, near Baku, but another field is also worked near Tiflis. A very important field on the northern flanks is Grozny, and there are other wells near Maikop. Russia ranks second among the world producers of oil, following the United States.

(c) *The Urals*.—Although the Urals, topographically, only form a low divide, the old rocks are brought to the surface and the tract in the centre is a highly mineralised one. Amongst the many deposits of iron ore the most remarkable is the enormous Magnet Mountain, near which the Russians have recently built the great iron and steel town of Magnetogorsk. Other important mineral deposits in the Urals include those of copper, manganese, nickel, gold and aluminium, but just as on the flanks of the Caucasus there occur the great oilfields of southern Russia, so it seems from recent discoveries that a line of oilfields exists on the flanks of the Urals, and oil has now been discovered at intervals almost from the Arctic Ocean to the Caspian Sea, though the exploitation is still small. On the Siberian flank there is an important coalfield, whilst in the north a recent discovery has been one of the largest deposits of potash salts, for use as a manure, yet known in the world.

(d) *The Plain of West Siberia* is essentially a low-lying area, formerly a gulf of the sea, now filled up with partly marine and partly land deposits, of the type which cannot be expected to yield any minerals. This is the case, and it is not until one reaches the south-eastern margin of this area that one finds the great coalfield of the Kuznetzk basin, now in course of development as an industrial region.

(e) *Central Siberia*.—The low plateau of central Siberia con-

sists of a great mass of ancient rock. In places, at least, these ancient rocks are known to yield metallic minerals—there are the famous gold deposits of the Lena basin and many other metallic minerals are believed to occur. On the flanks of the old plateau and covering part of the surface coalfields are known to exist; still largely unexplored, there is the Tungusk coal basin on the west, the Yakutia basin on the east. Better known are the fields on the south, the Minusinsk basin and the Irkutsk

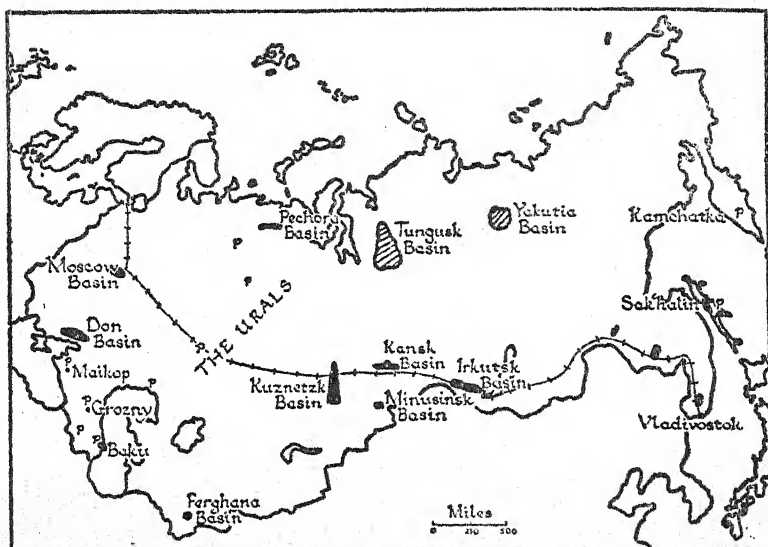


FIG. 86.—The coal and oil fields of Russia.

Coalfields in black; partly explored fields lined. P=Petroleum. Notice the position of the Trans-Siberian Railway.

basin and the Kansk basin, all of which have large reserves of coal.

(f) *The Far East* may be described as still an unknown area. Structurally it is complicated, and it is possible that it may yield important mineral deposits. Gold is known in several places, whilst in the south there are two coal basins; in the island of Sakhalin and in Kamchatka there is oil.

(g) *Russian Central Asia*, consisting as it does of a central plain with a surround of complex, highly folded mountains,

is proving, as one might expect, an important mineral-bearing area. There are small coal basins, oil may occur along the southern flanks, whilst in the ancient rocks there are gold, copper, lead, tin and zinc.

Although the claims of the Soviet may be regarded as optimistic, it is certain that the U.S.S.R. has enormous reserves of minerals. A recent claim suggests that the known reserves include half the world's iron ore, a third of the world's oil, 15 per cent. of the world's copper, 15 per cent. of coal, copper,

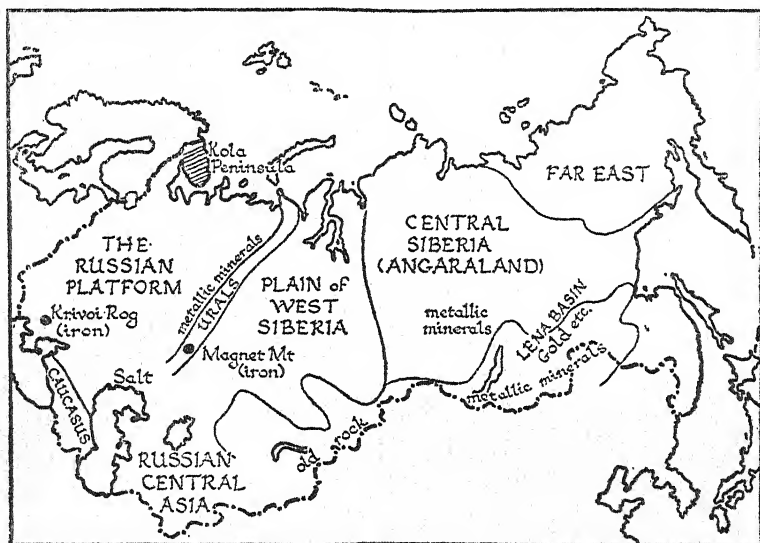


FIG. 87.—Other minerals of Russia.

and zinc, three-quarters of the world's manganese and a third of the world's water power.

It is claimed now also that the production of gold rivals that of South Africa, the world's largest producer.

**Climate.**—Russia constitutes the heart of the enormous land mass of Eurasia. This fact supplies the key to the climatic conditions. The enormous land area gets intensely cold in the winter, so that the coldest known spot of the earth's surface is not, as might be supposed, somewhere near the North or South Pole, but in the heart of Asiatic Russia; there the lowest



temperatures recorded on the earth's surface have been found, *e.g.*  $-73^{\circ}$  F. at Verkhoyansk. Extremely severe winter conditions are found everywhere in the north and centre, improving slightly as one goes outwards towards the south and particularly towards the south-west in Europe; even so, the whole country has an average temperature below freezing point for the month of January. Not a single square mile is as fortunate climatically in this respect as the whole of the British Isles.

In summer, on the other hand, the whole of the enormous

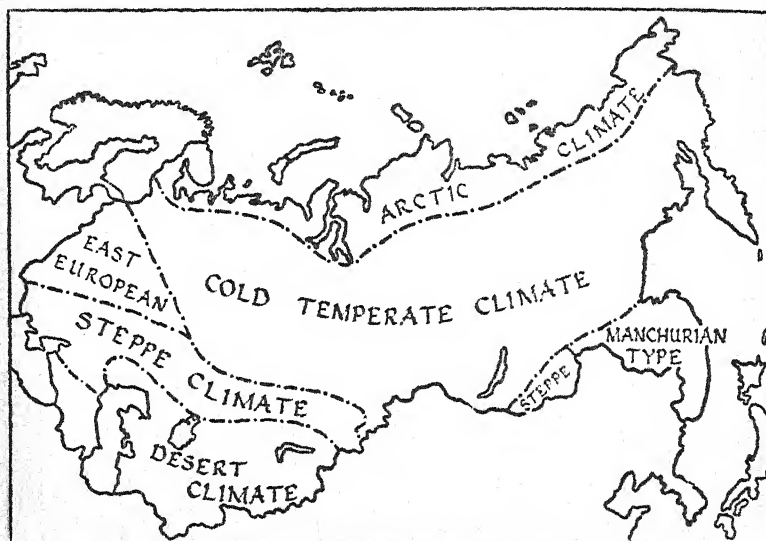


FIG. 88.—Climatic regions of Russia.

land mass gets intensely hot; temperatures of over  $90^{\circ}$  F. are sometimes recorded even within the Arctic circle. The deserts of Russian Central Asia suffer the most intense heat, but the whole country may be described as hot.

In winter the great mass of cold, heavy air which rests over the whole area results in a high-pressure centre from which there are out-blowing winds. Contrary to popular belief the snowfall in winter is correspondingly light. It is in the spring when the high-pressure area gives place to a low-pressure area that in-blowing winds from the ocean bring their quota of rain-

fall. Most parts of European Russia and the fertile belt of Siberia thus enjoy light, spring rains ideal for grain, followed by the heat of the summer.

The diagrams of the climatic divisions show the major divisions into which it is possible to divide the great mass of Russia.

**Soils and Natural Vegetation.**—The Russians have been pioneers in the great science of the study of the soil. They realised that the formation of soil does not depend so much upon the character of the underlying rock as on the character of the climate. So we find that the great soil belts of the country correspond with climatic conditions and run across the country from east to west. Thus the soil belts really constitute the great natural regions of the country. We may distinguish from north to south :

(a) *The Tundra Belt and the Tundra Soils.*—Here the cold in winter is such that the subsoil is permanently frozen ; the heat of summer is insufficient to do more than melt the moisture in the surface layers, with the result that in the summer the surface of the ground is swampy and the soils boggy. We are here beyond the northern limits of the growth of trees and the ground is covered with tundra vegetation, of mosses and lichens, including the famous reindeer moss, though for a short period there may be rich growth of grass and flowering plants.

(b) *The Belt of Coniferous or Soft-wood Forest,* with podsol (ash-coloured) soils.—Russia has by far the largest reserves of untouched forest lands of soft timber in the world, and the coniferous forest stretches as an enormous belt from the Finnish border right across the country to the Pacific Ocean, as far south, roughly, as the latitude of Leningrad. The great difficulty is one of access to the forests. Only the more accessible parts have been seriously worked so far. Unfortunately for Russia, the rivers which can be used for floating timber, at least for a few months in the summer, drain towards the Arctic Ocean. There has been a great increase in the exploitation of timber, even in the more distant forests, and the timber “ship caravans” of the Arctic Ocean are now piloted by ice-breakers and by aeroplanes which study the weather conditions. The soils of the forest are light ashen in colour, hence the name podsol, and they are poor in plant food. Thus when the forest is cleared they are not very valuable for agriculture even when the climate

would permit agricultural development. There are also large stretches of boggy soil and tracts of peat.

(c) *The Deciduous or Mixed Forest Belt of European Russia* consists partly of coniferous trees and partly of deciduous trees which lose their leaves in the winter. Here the soils are rather better and much of the land has been cleared.

(d) *The Black Earth Belt.*—The natural vegetation of this belt was a rich grassland with scattered trees. The soil consists of loess very dark in colour because of the large quantity of

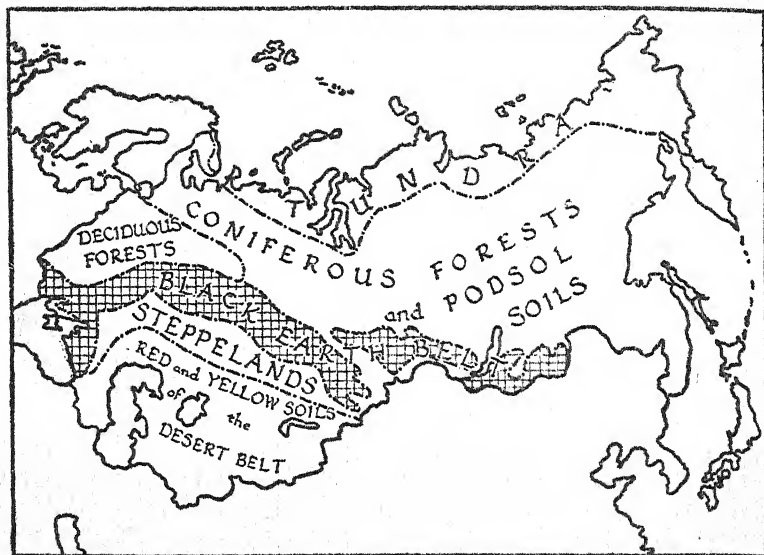


FIG. 89.—The soil and vegetation belts of Russia.

vegetable matter, and is a soil which is extremely fertile. As a result this is the great grain-growing belt of southern Russia and Siberia, and most of the natural vegetation has been removed.

(e) *The Chestnut-Brown Soils and the Steppelands.*—This is land formerly covered with grass rather poorer than in the belt just described, and where the soils, though good, are not quite so rich. This to-day is also a grain-growing region, but not of the same remarkable fertility as the Black Earth Belt.

(f) *The Red and Yellow Soils and the Saline Soils* are those characteristic of the drier regions of Russia around the Caspian

Sea and of Russian Central Asia. Here in some areas there is very poor grassland formerly inhabited by nomadic stock rearers with their flocks and herds. In the drier parts little grows, and settlement is only possible where water is available for irrigation. This is, however, an important part of Russia because it is the warmest, and here, on irrigated land, tropical and sub-tropical crops can be grown.

We should notice that along the southern border of the Crimean Peninsula there is a small, sheltered tract of land where the climate may be described as Mediterranean, and there Russia can grow some, at least, of the Mediterranean products. It is only a tiny tract, however.

**Animal Life.**—The grasslands and the steppes of Russia have been conquered and settled by man, but the great forest stretches to the north, to a large extent, have not. They are still the haunt of numerous wild animals, important because they are fur-bearing animals, and Russia thus provides a third of all the furs which enter into international trade. Some, such as the Russian sable, are now rare, and Russia is to pay attention to the breeding of fur-bearing animals such as the silver fox. Attempts are being made to utilise the wild animals of the north, particularly the reindeer, for the supply of milk, meat and other produce.

Russia has some fisheries along the northern coast and a few in the Far East, but more important and more famous are the river fisheries, especially of the River Volga for sturgeon, the roes of which yield that famous commodity, caviare.

### Man in Russia

**The People of Russia.**—The territory of Russia stretches from Europe right across Asia. In the same way the people of Russia are essentially Euro-Asiatic. Much of the failure of Western Europe and America to appreciate the true state of affairs in Russia to-day is due to our fundamental lack of understanding of the Russian people. In the first place, although the Russians are extraordinarily varied and include many different racial stocks, three-quarters of the whole are Slavs. During the Middle Ages these Slavs had again and again to withstand the invasions of fierce Mongolians from Asia. Various

Turkish and other tribes are to-day the principal inhabitants of Central Asia; they have penetrated to European Russia and to-day remain as large colonies not only on the Volga but in Ukraine beyond. It was the Slavs of Russia who protected Western Europe from these invasions, and we may almost say that the material progress of Western Europe in the last five or six centuries has been made possible by the protection afforded by the Russian Slavs.

The militaristic or Imperialistic organisation which persisted until the Revolution of 1917 is very largely the result of this long history of strife. In a broad and general way it is comparable to the feudal system as it existed in Britain. A great gulf separated the peasants from the ruling classes. The much misunderstood Cossacks were the Russians who were liable to military service and in return received arms and money grants from the Government and also a reservation of considerable stretches of land; they might be described as mercenaries, who were employed as the advance guard of colonisation or conquest and as the militaristic police force throughout the country. As in feudal England, there were serfs—and serfdom was not abolished until 1851, and even after that it was quite common for Russian slaves to be sold in the Far Eastern markets. The heart of Slav Russia was Moscow, but feudalistic Russia, as far as the ruling class was concerned, appreciated the civilisation of Western Europe and established its capital at St. Petersburg, now Leningrad, where communication by sea with Western Europe was possible. Imperialist Russia had designs on the conquest of much of Asia, and looked upon the far eastern coast with Vladivostok and Manchuria as its ultimate outpost in that direction. In the nineteenth century the frontier was pushed farther and farther so as to include what is now Russian Central Asia, and with the completion of the Trans-Siberian railway in 1905 Moscow was placed in direct communication with its Far Eastern possessions. But the prestige of the country received a severe setback on its defeat in the Russo-Japanese war of 1904-5. In the early nineteenth century Siberia was virtually an uninhabited tract, despite the inherent fertility of much of its area. Its severe winters gained it a notoriety which was heightened by its use as a place of exile for criminals. But all who resisted the existing régime

were also liable to exile ; many of the most progressive elements of the country who resisted political intolerance preferred to make their way to a new country and so went to Siberia as voluntary exiles. The virility of these political exiles has been largely responsible for the amazing growth of settlement, agriculture and urban life in Siberia, where the rapid growth of such centres as Novo-Sibirsk from about 5,000 in 1897 to nearly 200,000 to-day suggests a comparison with the pioneers who for the same reasons set out to conquer the Middle West of America.

In the twentieth century the organisation of Russia was an anachronism. In 1917 the mode of life and the standard of living of the bulk of the Russian peasants was not very different from that of the agricultural peasant of England in the Middle Ages. In assessing the results of the Bolshevist régime this must be borne in mind : the immense difficulty of conquering the inherent conservatism of the people and of educating vast numbers even to a state of literacy must be remembered. Thus we find that under the intensive programme of development of the First and Second Five Year Plans there has been undoubted material progress in all directions in Russia, but even to-day the standard of living is not in many respects comparable with that which normally exists in western Europe, whatever it may become in the near future.

**The Distribution of Population.**—In 1933 the population of Russia was nearly 166 million : at the census taken in 1897, the population of the same area was only a little over 106 million. Out of the present population rather over 7 million live in the Trans-Caucasian region, some 8 million in Russian Central Asia, the remainder in what may be described as Russia Proper in Europe and in Asia. Although Moscow has a population of 3,666,000 and Leningrad of 2,780,000, and there are 60 other towns with a population of over 100,000, more than half of all the total population of Russia may still be described as rural. We find that this rural population is densest along the famous Black Earth belt stretching from the borders of Rumania across the Urals into Siberia. Along this belt, too, are the great towns of Siberia such as Omsk, Novo-Sibirsk and Tomsk. To the north and south of this population tends to decrease, but with large urban nuclei in the industrial regions which will be described later.

**Occupations of the People.**—Imperialist Russia was essentially an agricultural country with a limited development of industry concentrated almost entirely in two regions :

- i. The immediate neighbourhood of Leningrad ; and
- ii. The central tract with its centre at Moscow, together with outlying industrial regions on the Don coalfield in the south and associated with oil in the neighbourhood of Baku.

Amongst the great objectives of the First Five Year Plan (1928–32) and the Second Five Year Plan (1933–37) have been not only the industrialisation of Russia to make the country a self-sufficient economic unit, but also the redistribution of industry in such a way as to locate the great industrial enterprises where power (coal, oil, water-power or peat) are available or where there is an abundant supply of raw material—particularly heavy and bulky raw material, *e.g.* iron ore—and also to utilise to the full labour resources in different parts of the country. The result will be, in the first place, to have local industries to supply local markets, a requirement very important in a country of such vast distances as Russia. In the old days raw cotton was sent 2,000 miles from Russian Central Asia to Moscow and sent 2,000 miles back as finished cloth ; this is obviously an absurdity, hence the establishment of industry in Russian Central Asia itself for the supply of local markets.

*Rural Occupations.*—34 per cent. of the whole of Russia is occupied by forest, 11 per cent. by pasture, non-agricultural land 31 per cent., arable land 9 per cent., but the area of the country is so vast that this 9 per cent. of arable land represents 500 million acres. The great cultivated belt is the Black Earth belt. Here the crops are wheat—spring wheat, for the winters are too severe for autumn sowing—and barley ; on the warmer southern side of the wheat belt maize or corn becomes the main or leading crop ; on the northern cooler side the place of wheat is taken by oats or rye—rye, the great bread grain of the peasantry over so much of the country. North of the latitude of Leningrad climate places a limit on the cultivation of many crops, and although barley takes advantage of the long summer days and will ripen within the Arctic Circle, a very important crop in these northern regions is oats.



Of the chief industrial crops, mention must be made of the cotton lands: Russia can really only grow cotton in Russian Central Asia, and hence it has been an objective to release as much land as possible for the purpose of growing cotton; this has been achieved by improving rail communications to Central Asia, sending foodstuffs and thus releasing land. It is in the Ukraine, that is to say in the south-west of European Russia, that sugar-beet cultivation is particularly important. Farther north in European Russia flax and hemp are leading crops.

The bulk of the cultivated land is now either in collective farms or in state farms. Tracts owned by single owner peasants are limited to about 50 million acres. Thus the primitive methods of agriculture are being replaced by large-scale American methods with the accompanying use of tractors, which are being manufactured in the country itself, particularly in those large towns lying within the agricultural belt, such as Stalingrad and Kharkov. Before the War Russia was a leading exporter of most of these cereal crops; naturally during the War the export disappeared and it has not recently been large. When the Bolshevik reorganisation of the country is complete there is every reason to believe, however, that Russian grain will be an enormous factor in world markets.

Amongst animals we may notice the still extensive use of horses in Russia, the cattle which are kept by the tribesmen on the drier steppelands of Asiatic Russia, the dairy cows and the beef cattle of the cooler northern regions (often in clearings amongst the forests), and also the dairy cattle of the great butter lands of Siberia and the more fertile valleys of Russian Central Asia. Sheep and goats, to the number of over 50 million, graze on the drier pastures south of the grain belt, whilst pigs are found, as usual, more within the actual grain belt itself.

The enormous forestry resources of Russia have already been briefly indicated, and there is a large working and export of timber *via* the northern rivers. This is particularly from European Russia at present, but the exploitation of the Siberian forests is progressing rapidly.

**Industry.**—The industries of Russia may be described particularly in relationship to the industrial areas.

1. *The Central Region around Moscow.*—In Imperial Russia, this region produced something like half of all the manufactured



goods produced in the country. To-day the importance of its output is no less, but relative to the output of the whole country it is less significant. Moscow itself is the great centre, to the south is Tula, to the north we find Kalinin, Yaroslavl and Ivanov, whilst to the east is Gorky. The whole region used to draw its coal from the far south, the Don basin; much more extensive use is now being made of the rather poor brown coal or lignite of the Moscow or Tula basin. The whole area is being

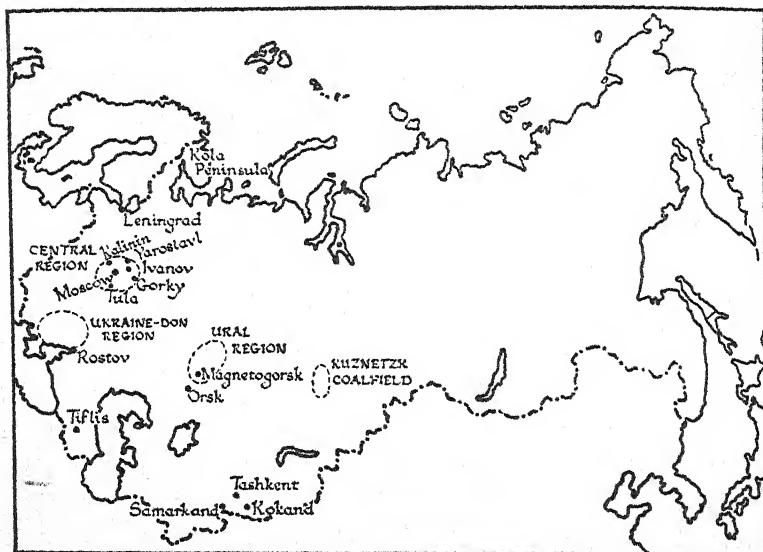


FIG. 90.—The industrial regions of Russia.

linked together in an electricity grid under the Second Five Year Plan. It is a region associated primarily with the cotton industry and with textiles generally and the manufacture of clothing, together with various metal workings and machinery manufacture and a chemical and miscellaneous industry. Gorky has the great automobile factory of the U.S.S.R.

2. *Leningrad*.—Leningrad is an artificial industrial centre, in that it has no coal nor has it sources of iron ore. It has, however, its sea-board situation, and as an industrial centre its position has been greatly improved in recent years by the

construction of hydro-electric works on two rivers in the neighbourhood. There is a ship-building industry specialising particularly in timber ships and ice-breakers ; there is the manu-

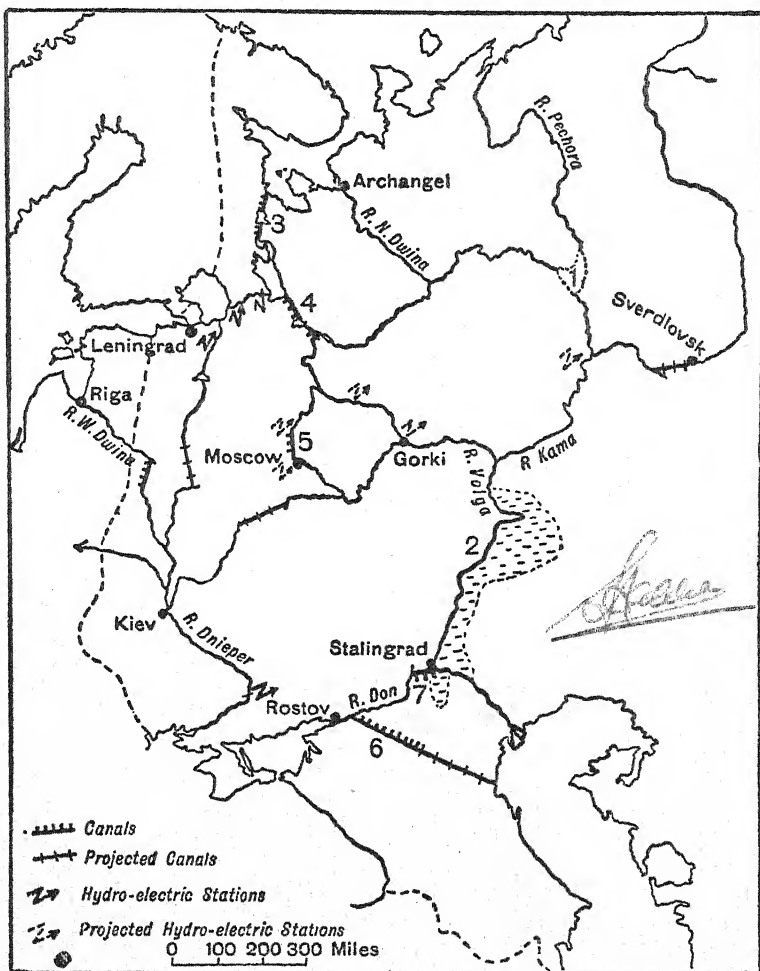


FIG. 91.—Waterways of European Russia.

Principal canals join the navigable rivers (canals numbered 3, 4, 5, 6 and 7).  
The famous White Sea Canal is No. 3.

facture of miscellaneous machinery, a limited textile industry, but an important clothing industry.

3. *The Ukraine-Don Region.*—This area covers the fine rich Don Coalfield, also one of the great iron-ore yielding regions, and in addition spreads over the very fertile Black Earth region of the Ukraine. Krivoi Rog has the largest iron ore deposit worked, and the region round the ironfield and also eastwards on the coalfield and at Rostov form the centre of iron and steel production, and we must remember that the output for

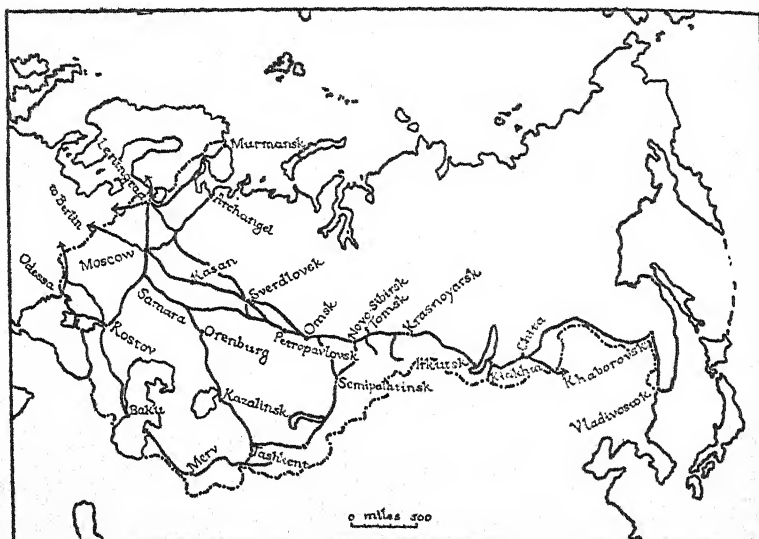


FIG. 92.—Railways of Russia.

the country is now over 10 million tons of pig-iron per year. There are numerous secondary industries which utilise the iron and steel, such as the manufacture of agricultural implements for use in the fertile belt by which the territory is surrounded. We have also the preparation of local agricultural material; thus there are sugar mills, flour mills and tanning factories.

4. *The Ural Region* is one of the newer industrial areas. The Urals have long been famous for their metallic minerals and great reserves of iron ore. 1,200 miles to the east in Siberia is the

enormous Kuznetzk coalfield, and it is the present plan in Russia to develop industry at both ends of a line of communication between the two. So there is the huge iron and steel town of Magnetogorsk and the newer one of Orsk at the western end amongst the Urals, whereas the Kuznetzk coalfield has itself become a great centre of industry which is growing rapidly.

5. *The Kuznetzk Coalfield* may be mentioned next. To the north one gets wood-working industries; on the field itself a great variety of manufactures, including textiles.

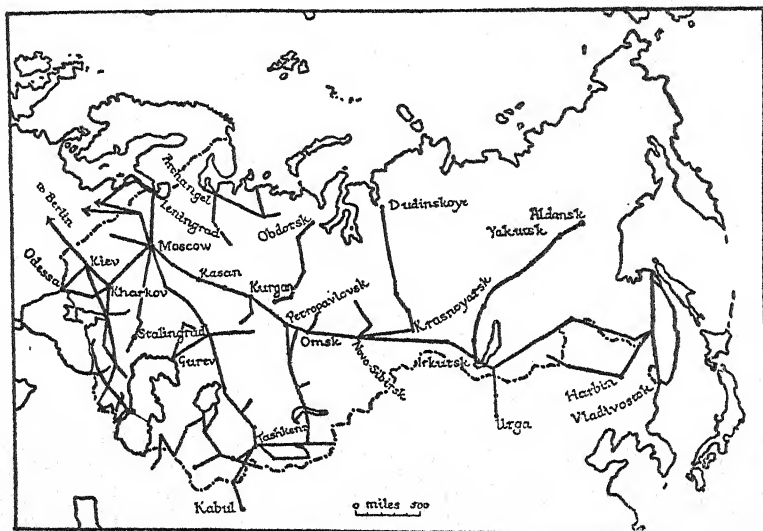


FIG. 93.—Airways of Russia.

6. *Other Industrial Centres.*—There is the growing industrialisation of the Kola peninsula in the north associated with timber working and with metals; there is the important Trans-Caucasian industrial region around Tiflis with its enormous reserves of oil and its utilisation of some coal together with metallic minerals; there is the growing industrialisation of Central Asia (where are the old market towns such as Tashkent, Samarkand and Kokand) in the cotton district with the object particularly of supplying the local market.

If we take the sum total of industrial occupations in Russia

we find that of the output of the country, 70 per cent. is now attributed to manufactures and the remaining 30 per cent. the produce of agriculture, almost the reverse of the position under the imperialist régime in 1913.

**Communications.**—The enormous size of Russia renders the question of communications one of the utmost importance. The rivers form natural routeways, but they are winding and often shallow, and frequently do not flow in the direction required by traffic. There has been a comprehensive scheme for improving the rivers and linking them up by canals, well illustrated in Fig. 91. Nearly 70,000 miles of inland waterway are classed as navigable; this may be compared with 50,000 miles of railway. Despite the enormous size of the country this is only double the mileage that there is in the British Isles, and this illustrates the fact that the railway network is a very open network compared with that in western Europe. This obviously accentuates:

- (a) The importance of developing local centres of manufacture so as to avoid the enormous distances of transport of the goods; and
- (b) The importance of developing easy and rapid means of communication by means of air.

It is not surprising to find that regular air routes now cover something like 30,000 miles, and that winter operation is permitted by the fitting of skis to the planes. The more important of the regular air routes are shown in Fig. 93.

**The Foreign Trade of Russia.**—It is very difficult to generalise at the present time regarding the foreign trade of Russia. Russia has concentrated on the development of her home resources and the Five Year Plans of the country are concerned particularly with industry at home and its organisation. For this purpose it has been necessary to pay for the services of foreign experts and, to a considerable degree, to import the necessary machinery from foreign countries. For that purpose the sale of Russian produce has been essential. Thus we find that in pre-War Russia by far the most important exports were grain and agricultural produce: taking the present position foodstuffs represent only about an eighth, animal products together with fisheries and the produce of trappers, mainly furs,

another eighth. Timber is important and represents now over 15 per cent., and oil takes a high place also. As indicative of the needs of the country more than two-thirds of all the imports of the country are machinery, including electrical machinery. Imports are obtained in very large measure from Germany, Britain and the United States. But the changing character and direction of Russian trade should be followed carefully

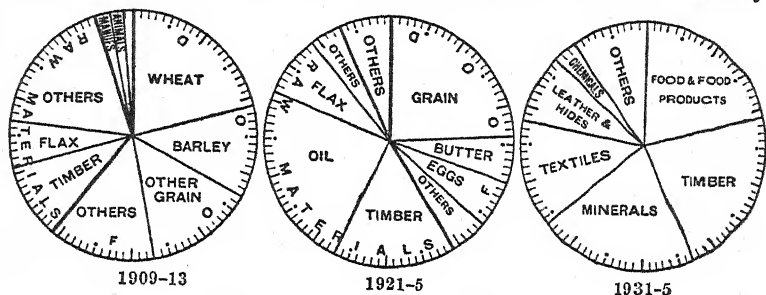


FIG. 94.—The exports of Russia.

The great change in the chief exports should be noted.

from the pages of the annual reports of the financial papers. A considerable proportion of the foreign trade passes through Leningrad, though some of the timber exports come direct from the small northern ports, including Murmansk, which is open throughout the year. The great grain port of the south was Odessa, on the Black Sea. The oil is sent by pipe-line from Baku to Batum or to other of the Black Sea ports. Exports from the Far East through Vladivostok are limited.

## CHAPTER XIII

# The British Empire

### Part 1. GENERAL CONSIDERATIONS

The British Empire, perhaps better called the British Commonwealth of Nations, is the largest union of countries which the world has ever known. Not including British claims in the Antarctic continent, the total area is nearly  $13\frac{3}{4}$  million square miles. Out of this total the United Kingdom of Great Britain and Northern Ireland represents only 95,000, that is, approximately only 0.7 per cent. of the whole. India and Burma with a total area of 1,800,000 square miles represent 13 per cent. of the whole. The total population of the British Empire is approximately 500 million, between a quarter and a third of all mankind. Of this total over 70 per cent. live in India and Burma. The home country, too, is very densely populated and so has between 9 and 10 per cent. of the total population : whilst the remaining 86 per cent. of the Empire has only 20 per cent. of the population.

From the point of view of extent the British Empire covers an area one and a half times the area of the Union of Socialist Soviet Republics, and an area more than four times that of the whole of the United States. But it is really utterly impossible to compare the British Empire with any other of the Great Powers ; the fundamental differences are too great. In the first place the Empire consists of a large number of scattered tracts of country, arranged literally all over the globe. Not only do the separate tracts include those territories within the tropics and in warm temperate countries, where there is a large native population and where the British may be said to hold the land in trust for the benefit of its native inhabitants, but the Empire also includes enormous tracts of country which are settled exclusively by people allied in race and language to the home country, and who are still closely connected with the home

country by ties of blood relationship. France, Belgium and Holland share with Britain in the first responsibility, but not one of the three has the problems associated with large overseas territories inhabited almost exclusively by people of their own stock. In this way the British Empire is, again, unique.

From another angle, if we look at the resources of the Empire as a whole we see the significance of the fact that portions of the Empire are found in every type of climate in every part of the world. The British Empire is capable of producing and indeed does produce, at least in most cases, all that it requires in materials of animal or vegetable origin. It is because of this fact that Empire Free Trade is at least a possibility from the scientific angle. Climatic considerations do not, however, control the world distribution of mineral substances, and here the economic self-sufficiency breaks down. The Empire only produces 2 to 3 per cent. of the world's oil, and it is rather doubtful whether this proportion can be increased to any considerable degree; thus the British Navy, to mention only one result of this, must at the moment either be dependent on foreign supplies of oil, or on supplies of oil from foreign countries which are produced by British capital and enterprise. An alternative, which is being seriously developed at the moment, is a supply of oil derived from British or British Empire coal. Oil may be said to constitute the only or major exception that the British Empire can be self-sufficient in the supply of all raw materials.

The British Empire is, of course, rather like a complicated machine, whose different parts, large and small, all have their appropriate function. Many of the smaller possessions are significant not because of their production, but because of their position. Willingly or unwillingly Britain has tended to assume the function of policeman in the world; many of our police stations such as Gibraltar, Malta and Aden may be a considerable burden on the home tax-payer, and it is not too much to say that many other parts of the Empire are liabilities rather than assets, a fact which is very frequently overlooked.



## Part 2. THE HOME COUNTRY—THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

**Position and Size.**—The British Isles comprise the two large islands (Great Britain and Ireland) together with a number of smaller islands, lying off the north-west coast of Continental Europe. "United Kingdom" formerly meant the United Kingdom of Great Britain and Ireland; since the separation of the Irish Free State in 1920 it means the United Kingdom of Great Britain and Northern Ireland. The distinction is important when comparing pre-War and post-War statistics, and care must always be taken when studying figures in official publications to see whether they apply to England and Wales only, or to Great Britain or to the United Kingdom. It should be noted that the Channel Isles and the Isle of Man enjoy certain privileges in matters of government and are sometimes included, sometimes excluded, in statistical compilations. The following table is given for reference purposes:

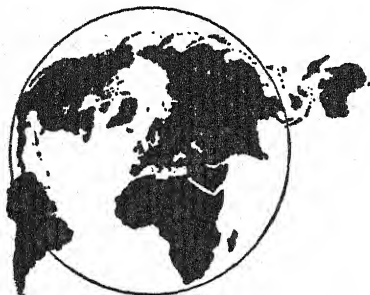


FIG. 95.—The world position of the British Isles—London the centre of the land hemisphere.

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	Area in square miles	Population in millions		Density	
		1921	1931	1921	1931
The British Isles .	121,000 <sup>1</sup>	47.15	—	—	—
England . . .	50,874	35.68	37.80	701	724
Wales . . .	7,466	2.21	2.16	295	289
Scotland . . .	30,405	4.88	4.84	164	163
Isle of Man . .	221	0.06	0.05	273	224
Channel Isles .	75	0.09	0.09	1,203	1,238
Northern Ireland	5,237 <sup>2</sup>	1.26 <sup>3</sup>	1.28 <sup>4</sup>	240	244 <sup>4</sup>
Irish Free State	26,592 <sup>2</sup>	2.97 <sup>3</sup>	2.97 <sup>3</sup>	112	112 <sup>5</sup>

<sup>1</sup> Approx.

<sup>2</sup> Excluding inland waters  
<sup>5</sup> 1936.

<sup>3</sup> 1926.

<sup>4</sup> 1937.

England, Scotland and Wales have been joined under one king since 1603. Northern Ireland has a parliament of its own but is otherwise closely united with Great Britain, but the Irish Free State is an independent dominion of the British Empire, with a president of its own.

The British Isles lie mainly within the quadrilateral formed by two lines of longitude ( $0^{\circ}$  and  $10^{\circ}$  West) and two lines of latitude ( $50^{\circ}$  and  $60^{\circ}$  North). In the halcyon days of Greece and Rome, and indeed until the Middle Ages—so long as the Mediterranean remained the focus of the world's life and commerce—the British Isles lay on the fringe of the known world. The discovery of America and the rapid growth in importance of the lands on the western side of the Atlantic revolutionised the importance of Britain's geographical position. Britain lies in the centre of the land hemisphere. Her climate is kept genial and her ports always free from ice by the influence of the North Atlantic Drift. She faces the most important and most developed part of America on the one hand and the embouchure of the important rivers of Europe on the other. The English Channel, narrowing eastwards to the Strait of Dover which is only twenty-one miles wide at the narrowest part, separates the south of England from France; the North Sea lies between Britain and Holland, Germany, Denmark and Norway. There is no doubt that the central geographical position of Britain in the modern world is an important factor in her prosperity.

**Physical Features and Structure.**—The advantages accruing to the British Isles by virtue of their world position have been greatly enhanced by the structure of the islands themselves. The seas surrounding the islands are shallow—and the extensive continental shelf affords breeding and feeding grounds for the fish which from earliest times have attracted Britons to the sea. The British Isles have a very long coastline, for the coasts are very deeply indented so that no part of the islands is as much as one hundred miles from the sea. The tide-scoured inlets afford excellent harbours and, further, there are no high mountains to hinder communication with the interior. Though many parts of the islands are hilly and even mountainous, the greatest elevation reached in England and Wales is under 4,000 feet, whilst the highest peak in Scotland, Ben Nevis, attains but 4,400 feet.



the Grampians. The Highlands consist of an ancient massif, mainly of very ancient crystalline rocks, and forming one of the masses already mentioned as lying in the north of Europe. Masses of granite penetrate the old rocks and in some areas are quarried as building stone (as at Peterhead and Aberdeen). The scenery of the plateau has been moulded to a large extent by ice action during the Great Ice Age. The west coast is a typical fiorded coast with wild rocky scenery. The fiords of Scotland, like those of Norway, are deep, steep-sided inlets of the sea, often marked by sharp, almost right-angled bends and by a submerged ridge near the mouth. They are generally believed to have been excavated by tongues of ice working along lines of weakness caused by sets of great cracks at right angles. The ancient rocks afford but poor soil; the Highlands are for the most part covered with moorland and the most fertile land is in the eastern valleys and coastal plain or plateau (east of the fine line in Fig. 96).

*The Southern Uplands* are formed by a broad low fold range running with a north-east to south-west trend across the south. Again they yield but a poor soil, hence the prevalence of sheep pastures.

*The Midland Valley*, the most important part of Scotland, lies between the Highlands and the Southern Uplands. Though on the whole a lowland area it is broken up by many hills. It is a great rift valley consisting of a block of sedimentary strata let down between the older rocks of the Highlands on the north and the Southern Uplands to the south. The faults which bound the valley run across the country in a north-east to south-west direction. The "Highland Boundary Fault" is especially well marked and the change of country is remarkable. On either side of the Midland Valley are the Old Red Sandstone rocks; in the centre the beds are mainly of Coal Measure Age and include three great coal basins—the Central, Lanarkshire or Clyde Basin in the centre; Midlothian and Fifeshire (actually joined under the Firth of Forth) in the east; Ayrshire in the west. Masses of old volcanic rocks give rise to hilly areas in the valley itself (Ochil Hills, Sidlaw Hills, etc.).

England and Wales may be divided as shown in Fig. 96. The heavier lines show divisions of major importance.

If a line is drawn across England and Wales from south-west

to north-east, it is found that the old rocks and the mountainous regions lie to the north-west, whilst to the south-east are mostly young rocks and lowlands. To the north-west there are three main areas of mountains :

*Cumbria* or *The Lake District* of the north was probably once continuous with the Isle of Man. The old rocks in the centre of the Lake District are wrapped round on all sides by younger. The centre is thus poor moorland, famed for its scenery and its radial lakes occupying hollows scooped out by the glaciers of the Ice Age. .

*Wales*, consisting of very old rocks in the north (Cambrian Mountains), folded so that the grain of the country is the same as in the Highlands and Southern Uplands of Scotland, *i.e.* "Caledonian" (N.E.-S.W.). In South Wales is an area of younger rocks folded into a great basin or syncline, and forming the South Wales Coalfield. The fold has an Armorican or east-westerly trend.

*The South-Western Peninsula* (Devon and Cornwall) is also built up of a massif of ancient rocks folded into east-westerly folds. The rocks have been penetrated by a number of great granite masses and it is with the marginal areas of these granites that the metalliferous zones are associated.

Then running down the centre of the north of England is its backbone, *the Pennines*. Part of the great plain of the Midlands wraps round the southern end of the Pennine Upland and separates it from the other hill masses. The plain to the west may be called *Lancastria*; the lowland to the east is more complex.

The south-east of England, *The Scarplands*, consists of low ridges (scarps) running from south-west to north-east, marking the outcrops of successive beds of more resistant rock, separated by valleys marking the outcrop of more easily eroded strata. In the extreme south-east is an arch or anticline running from east to west (the *Weald*), whilst London lies in the syncline (*London Basin*) of which the *Hampshire Basin* is a counterpart. *East Anglia* partakes of the nature of a low plateau.

*Rivers*.—The rivers of the British Isles are short, and since the mountains are usually on the western sides of the islands, most of the longest ones flow eastwards. The rivers are not as a rule swift enough to supply hydro-electric power (though

some of the Scottish streams are sufficiently swift, and in Ireland the River Shannon has been harnessed); they are too shallow



FIG. 97.—Rivers and hydro-electric power in Britain.

The heavy line shows the main water parting; five of the larger basins are separately indicated. The black triangles are points where water power has been developed.

to be used by river steamers, but they are very important commercially, because their mouths are often navigable by the

largest ocean-going vessels and afford excellent harbours. They are little subject to floods but have a gentle flow of water, and tides help to keep the mouths clear all the year round. They are rarely, if ever, frozen. Look carefully at the map and note the position of these rivers, with the ports which lie near their mouths: Dee, Tay, Forth (east of Scotland), Tyne, Tees, Humber, Thames (east coast of England), Clyde (west of Scot-

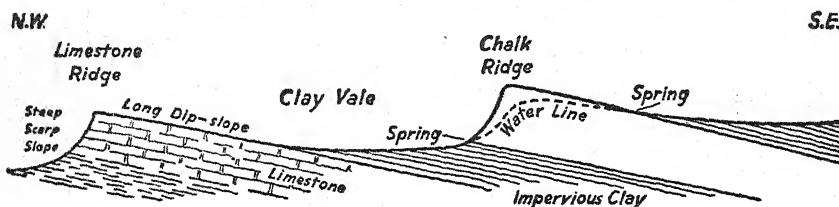


FIG. 98.—Diagrammatic section illustrating the succession of clay vales and limestone ridges found in the south-east of England.

land), Mersey and Severn (west of England). The only large river in Ireland is the Shannon. The fact that the majority of English and Scottish rivers flow eastwards is a fortunate circumstance from the economic point of view, since their mouths face the great river outlets of the Continent. Though not mountainous, practically the whole surface of England is hilly, and the relative unimportance of water transport, despite an



FIG. 99.—Section across the Weald from north to south.

extensive canal system, when compared with France or Germany, is due mainly to the large number of locks necessary on the canals.

**Minerals.**—Of the mineral output of Great Britain about 90 per cent. is represented by coal (including anthracite). Iron ore, though important, is only about 1.5 per cent. All the other minerals of which the annual value is over £1,000,000 are

non-metallic, and include limestone and chalk (for cement), and limestone for building stones, igneous rocks (specially granite for building and road stone), slate, clay for bricks, salt, china clay, and sandstone. Of the metallic minerals for which Britain was once famous, tin ore is the only one of any considerable value. The mining industries in Great Britain give employment to over a million people in normal years.

*Coal.*—Originally Carboniferous rocks, probably including Coal Measures with coal seams, were deposited as continuous sheets right across the north of England. Subsequently they were folded by a great fold with a north-south trend so that the coal is now found on either side of a central ridge (the Pennines) of older Carboniferous rocks. East-west folds also affected the area so that the coal seams actually occur in isolated basins arranged on either side of the Pennine Uplift thus :—

Cumberland Coalfield	Pennine Uplift	Northumberland-Durham Coalfield
Lancashire Coalfield		Yorkshire, Derbyshire and
North Staffs Coalfield		Nottinghamshire Coalfield
South Staffs Coalfield		Leicestershire Coalfield

The fields of South Wales, Forest of Dean, Bristol and East Kent belong to a separate southern group. The Scottish fields are in the Midland Valley and comprise the Ayrshire field in the west, the large Central field situated mainly in Lanark but extending into the counties of Stirling and Clackmannan and the fields of Fifeshire and Midlothian in the east. The following table is appended to show the relative importance of the fields (figures in millions of tons) :—

Field	1909-13	1922-24	1931-35
Scotland . . . . .	41	37	30
Northumberland . . . . .	14	14	13
Durham . . . . .	40	37	29
South Wales . . . . .	51	52	35
Yorkshire . . . . .	39	45	39
Notts and Derby . . . . .	29	30	27
Warwick and Leicester, etc. . . . .	—	14	13
Lancashire and N. Staffs. . . . .	30	26	20

The quality of the coal differs from one field to another. Anthracite is practically restricted to the western part of the



South Wales field; other coals of South Wales are particularly celebrated as steam coals. It should be noted that practically all the coal raised in Great Britain is of Carboniferous age; there are practically no brown coals.

There is no question of the exhaustion of British coal. The depression in the industry is due (a) to the gradual disappearance of the export market (see p. 123), and (b) the fact that

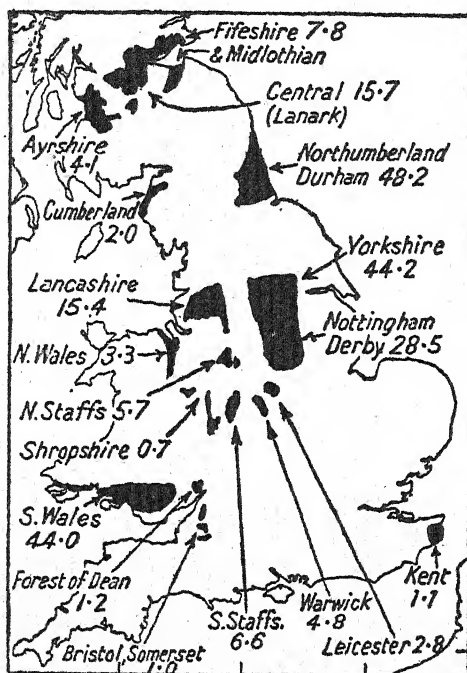


FIG. 100.—The coalfields of Britain, showing output in millions of tons 1927-31.

there are many small old, uneconomic workings. The newer, larger units in the deeper parts of the fields are the only economic units under modern conditions.

*Iron Ores.*—Although the prosperity of the iron and steel industry of the British Isles was consequent to a large extent upon the association of iron ore and coal in the coalfields, comparatively little of the iron ore now mined is from coalfield

regions. The most important iron ores are the bedded sedimentary ores of low grade but huge extent and easily mined, occurring in the Jurassic rocks, especially in the Cleveland field of Yorkshire, and in the Midlands (Lincoln, Northampton and

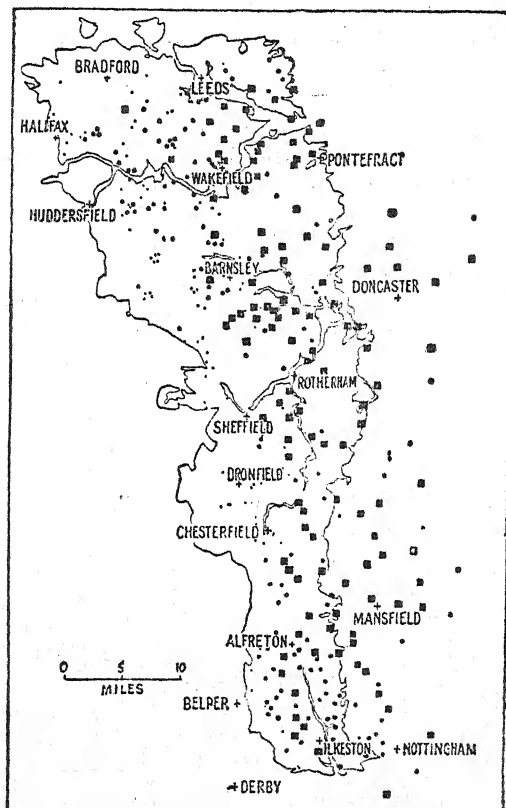


FIG. 101.—The Yorkshire-Nottingham-Derby coalfield.

The square dots represent collieries employing more than 1,000 men, the large round dots 100-1,000, the tiny dots those with less than 100. Notice how the small old pits are in the shallow western part of the field.

Rutland). The coalfield where iron ore is still mined in some quantity is North Staffordshire. The Cumberland and North Lancashire iron ores, mined especially near Barrow, are purer ores and occur as masses in limestone.

*Metals.*—Amongst metallic minerals the once famous tin fields of Cornwall have now but a small output. There is a small production of wolfram from the same area, but that of copper is now almost negligible. Lead ore is widely distributed in the British Isles, but the workings are all small, and lie mainly in northern England, Derbyshire, and in the Lead Hills of southern Scotland.

*Non-metallic Minerals.*—The British Isles are well supplied with building stones and road metal. Amongst the former may be specially noted the grey granite of Aberdeen and the handsome Shap granite of Cumberland; the magnesian limestones of the north-east of England; the Portland oolites and Bath freestones of the Portland and Bath districts respectively. Enormous quantities of limestone, including chalk, are burnt for the production of lime and Portland cement—the cement works using chalk on the lower reaches of the Thames and Medway are especially noteworthy. The china clay industry of Devon and Cornwall is also important; the china clay occurs as an alteration product overlying certain of the granite masses, but especially near St. Austell. Formerly clay for brickmaking was widely dug in many parts of the country, but there has been a marked tendency to the concentration of the industry in a few areas—notably at Peterborough. The fireclays and ganisters of the coalfields have, of course, special uses, and so have the pure white pottery clays such as those of Poole. The slates of North Wales and Devon-Cornwall are less important than formerly, owing to the decrease in popularity of slate as a roofing material, but the decrease in importance of the Scottish oil-shales is partly the result of exhaustion, partly of the competition of foreign crude oils. The most famous area for salt is Cheshire, but the large deposits of South Durham have given rise to the great chemical industry there. Mention should be made of the fine moulding sands of the Midlands, very important in the iron industry.

*Climate and Weather.*—On reference to Chapter III it will be remembered that the British Isles lie in the climatic region common to north-western Europe. Actually our *weather* is largely dependent on three great pressure systems: in winter a low-pressure system over Iceland, a high-pressure system over the Azores, and a high pressure over eastern Europe. Similarly,

in summer we noticed the low-pressure system again over Iceland, but usually farther north when compared with its winter position ; again there is a high pressure over the Azores, but this time with a tendency to be centred considerably farther north ; whilst in summer the winter high pressure over Russia is replaced by a great low-pressure system. When one looks at a map of Europe one notices that the British Isles tend to be centrally situated between the three great pressure systems ; and actually our weather is very largely determined by their relative strength. In winter there is a distinct tendency for the low-pressure system over Iceland to be most potent in determining the weather of these islands, except in those years when the high-pressure system of eastern Europe is exceptionally strong, and extends its influence as far as the east coast of Scotland and England. For example, in the winter of 1928-9, when settled cold weather prevailed for long periods at a time, with cold easterly or north-easterly winds, it was found that the pressure system of eastern Europe was extending its influence as far as these islands. It should be noticed that when one of the great high-pressure systems extends its influence in this way, there is a distinct tendency for the weather to remain settled for considerable periods of time. Thus in summer when the high-pressure system of the Azores stretches rather north of its normal position, there is a possibility that at least the south of England will enjoy long spells of fine weather. This happened in the summer of 1929. That summer was marked in northern Scotland, however, by an extended period of bad weather ; in other words, the path of the cyclones from the Atlantic lay along the northern fringe of the high-pressure system, which remained comparatively stable over southern Britain.

The variability of British weather is a byword, and one may say that for three-quarters of the year our weather is determined by the passage across the islands of a succession of secondary depressions or secondary cyclones with intervening ridges of high pressure. Since this is the case, it is desirable to examine in a little more detail the succession of weather which results. One must remember that a cyclone or depression in the Northern Hemisphere is marked by a low-pressure centre with upward currents of air. Winds tend to blow towards this centre, and at the same time round the system in an anti-clockwise direction.

When a depression, therefore, is approaching these islands from the Atlantic, the barometer will fall and the winds will be southerly to south-westerly, veering westerly later. Coming from the Atlantic they will be warm and moisture-laden; blowing northwards towards cooler regions, and also towards the centre of the depression, where they will rise, they tend to bring rain. After the centre of the depression has passed across the islands, the barometer will again rise, and the normal air currents will now be colder winds from the north or north-east, but winds

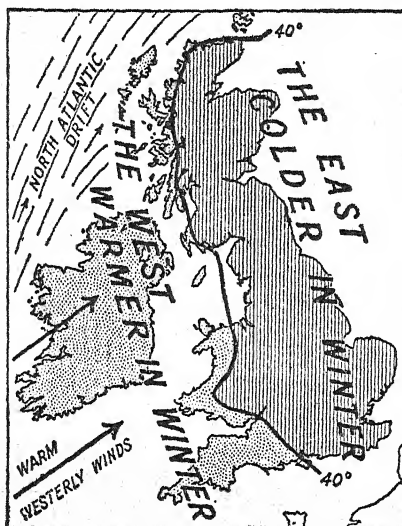


FIG.102.—Map showing climatic conditions in the British Isles in January.

At this season a tract of the centre and north-eastern Ireland has also an average temperature below 40° F.

which are comparatively dry. The passage of such a depression is often followed by the passage of a ridge of high pressure, ushered in by a continuation of the cool northerly winds and a steadily rising barometer. Fine sunny weather will result in the summer, but as the winds decrease and calm conditions prevail, the passage of such a ridge of high pressure is marred in winter by the occurrence of fog.

Turning now to the average weather or climatic conditions of the British Isles, one may say that these islands reflect in detail the conditions which prevail in general in Europe. In

winter the west is warmer than the east, and the isotherm of  $40^{\circ}$  F. in January roughly divides the islands in two, and its course should be very carefully noticed. In summer, on the other hand, the south is warmer than the north, and the isotherm of  $60^{\circ}$  F. runs roughly from east to west. Thus these two isotherms divide the British Isles into four quarters. The south-east quarter (in the neighbourhood of London) is the most continental, that is, the centre for the greatest temperature differences between summer and winter, whilst the north-west quadrant is the most typically oceanic. The rainfall of the British Isles is well distributed throughout the year, and all parts of the islands receive an adequate rainfall. In many of the more hilly regions the rainfall must be classed as excessive. The coasts of Ireland, western Scotland, and many parts of western England and Wales, receive too much moisture, and it is comparatively rarely that drought is a serious menace. Fig. 104 shows those parts of the British Isles which receive

less than 30 inches of rainfall, and it will be noticed later that cereal farming—with the exception of that hardy crop, oats—is largely restricted to the regions having less than 30 inches of rain per year. It has, indeed, been suggested that England can be divided into four agricultural provinces by using the  $60^{\circ}$  F. July isotherm and the 30 inches rainfall line. It is interesting to experiment with this on a map, and see how true this statement may be.

**Natural Vegetation.**—The natural vegetation of the British Isles has now been so largely removed that it is difficult to

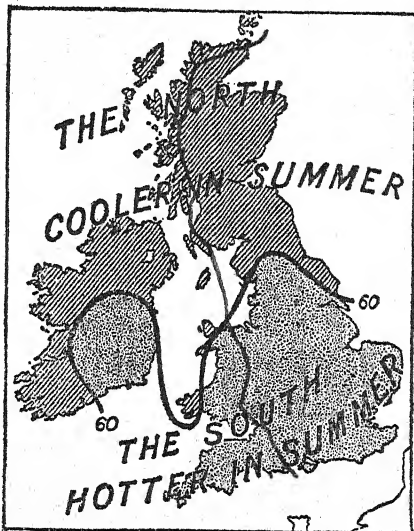


FIG. 103.—Map showing climatic conditions in the British Isles in July.

picture the country as it must once have been. Broadly speaking, the whole of the lowlands must have been clothed with thick, deciduous forests of oak, ash, beech, birch, and other common trees of the countryside. Extensive tracts of marshland, such as the Fen country and Romney Marsh, formed a break in the spread of forests, and rising above both were the great tracts of the Welsh highlands, the Pennines, the Southern

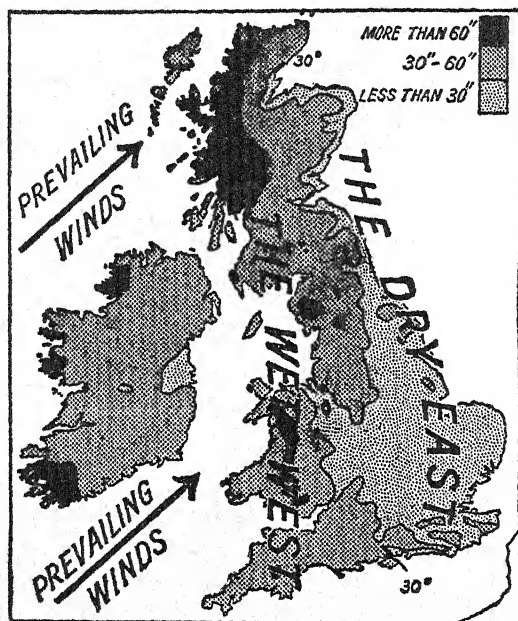


FIG. 104.—A simple rainfall map of the British Isles.

Uplands, and the Highlands of Scotland, and also the grass-covered downs of the chalk country. It is necessary to remember that the winters are milder in the north-west of Scotland than in the south-east of England; so deciduous forest is just as characteristic there in the north as it is in the south, except where other factors intervene. Such other factors include winds, and the wind-swept hillsides of north-western Ireland or Scotland do not favour the growth of trees. Poor soils, such as the stony soils of much of Wales, the Highlands of Scotland,

or the sandy tracts of the south of England, cause coniferous forests to replace the deciduous woodland. Even on low ground with poor sandy soil the heathlands which flourish here must have existed in times past much as they are at present. It is interesting to notice that the settlements and highways of the early Britons avoided the low ground (for this was only thick forest or marshes), and are found on the high ground, which is,

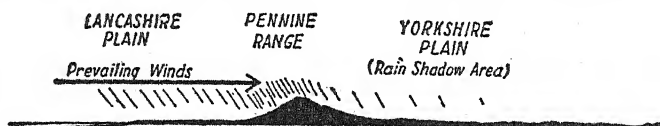


FIG. 105.—Section across the Pennine Range, showing the rain-shadow area on the east.

at the present day, the location of comparatively few villages or towns. At the present day the ancient forests have been so largely removed that forests and woodland occupy a smaller proportion of the surface than in any other European country. But the British Isles still appear to be well wooded, because of the numerous small woods, hedgerows with isolated trees, and “park-like” scenery so characteristic of the country. The following table shows the utilisation of the surface in the British Isles :

	Woods and plantations	Rough grazing land	Per- manent pasture	Arable	Other land
	per cent.	per cent.	per cent.	per cent.	per cent.
England . . .	5	11	43	27	14
Wales . . .	5	34	42	12	7
Scotland . . .	6	67	8	16	3
Northern Ireland	1	16	46	28	9
Irish Free State	1.4	12	47	21	18.6

This table shows the very small area actually covered by woods and plantations in all parts of the British Isles. Nearly all the timber required has to be imported, yet there are millions of acres of moorland which might be planted with trees. More forest land is one of the greatest needs of Britain. Most of the “rough grazing land” is the heather-covered moorland and the



heathland which covers such huge areas of the uplands. The high percentage in Scotland is particularly noticeable.

**Agriculture.**—The relative importance of agriculture in Britain is perhaps best gauged by noting the value of primary production, compared with that of manufactures. These figures are for *Great Britain* after the Great Depression of 1931–3 :

	£
Agriculture (1936–37) . . . . .	221,000,000
Fisheries (1937) . . . . .	16,000,000
Mines (1936) <sup>1</sup> . . . . .	183,000,000
Manufactures (1935) . . . . .	3,464,000,000

The figure given above for agricultural produce is the value of produce sold off the farms (excluding, therefore, consumption in farmers' households) and is made up as follows :

	£	%
Farm crops . . . . .	33,000,000	16·4
Live stock—meat . . . . .	65,000,000	32·1
Dairy produce . . . . .	55,000,000	27·1
Wool . . . . .	1,300,000	0·7
Poultry . . . . .	5,300,000	2·5
Eggs . . . . .	16,000,000	7·8
Miscellaneous . . . . .	27,000,000	13·4

In its broad lines the distribution of the different types of agriculture in Great Britain is controlled by geographical factors; in the details of development, especially in recent years, the economic factors are more noteworthy. The two maps, Figs. 106 and 107, illustrate the first point. Most of the hilly western counties of England, Wales, and large parts of Scotland have nearly half their surface occupied by moorland or "rough hill pasture." Turning to the plains of the Midlands and south-eastern England, Fig. 107 shows that permanent pasture occupies more than half the total area in most of the damper, western counties of the Midlands; arable land more than half the total area only in the drier eastern counties.

An essential characteristic of the intensive agriculture of Great Britain is the crop rotation. A five-year rotation (clover; wheat; potatoes or root crop; oats or barley; barley) is still

<sup>1</sup> The value of the mineral output has fluctuated widely in recent years owing to disturbances in the coal industry. The 1927 total was £207,000,000. Figures from *Statesman's Year Book*. 1930 : £188,000,000, 1933 : £152,000,000, 1935 : £166,000,000.

commonly used, but rotations are tending to be irregular in recent practice.

Clovers or other leguminous crops are very important factors in the scheme since, as a result of bacteria living in their root nodules capable of "fixing" atmospheric nitrogen and converting it into nitrogenous plant foods, they *add* to the fertility of the soil instead of detracting from it.



FIG. 106.—Rough hill pastures in the British Isles.

Mixed farming with high crop-yields is thus characteristic of British agriculture. Until the recent wheat subsidy there has been a steady decrease in area of arable land in the last half-century, only partly offset by the increased importance of dairy-farming. The causes are economic.

*Wheat* occupies about  $1\frac{3}{4}$  million acres in England and Wales, but only a small area in Scotland, where the northern limit for

its cultivation is reached, and in Ireland, which is, on the whole, too damp. The average yield is 31.5 bushels of 60 lbs. each per acre, so that Britain grows at home roughly  $1\frac{1}{2}$  million tons compared with an import of over 5 million tons.

The distribution of *barley* is very similar to that of wheat (compare Chapter IV), but *oats* cover large areas in Scotland

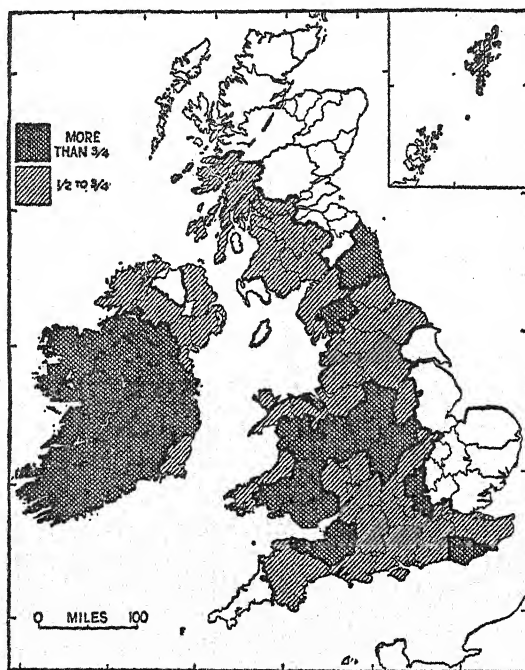


FIG. 107.—Permanent grass in the British Isles.

Each county in the shaded area has more permanent grass than ploughed land.  
The unshaded parts have more ploughed land than grassland.

and Ireland as well as in England and Wales. The ability of oats to withstand the cooler, damper climates of the north and west is well shown.

*Root crops* (turnips, swedes, and mangold—all largely used for cattle and sheep food) occupy large areas. Potatoes occupy almost as much land in Ireland as they do in Great Britain. Sugar beet is grown mainly in the east of England.

*Hay and fodder crops* cover more than 7,000,000 acres in Britain and nearly half this area in Ireland.

*Peas and Beans* are other important crops; the *flax* of north-eastern Ireland now occupies but a small acreage.

*Fruit Orchards* include the cider-apple orchards of Herefordshire, Devon and Somerset, and of the fruit orchards of the "home counties" supplying the London markets. Kent, along the fertile northern slopes of the North Downs, is *par excellence* the county for "small fruit"—raspberries, currants, gooseberries, etc.—though the Fens and the Scottish area of the Carse of Gowrie near Dundee are important. Hops are mainly of importance in the Weald of Kent and in Herefordshire. Fruit

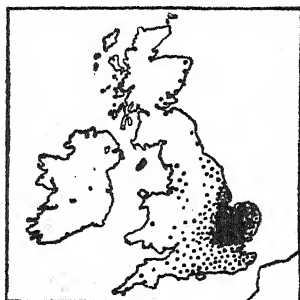


FIG. 108.—The wheatlands of the British Isles.



FIG. 109.—The oat-growing regions of the British Isles.

and vegetable canning has recently become very important especially in the Fens and the south-east.

*Animals.*—With the increase in motor transport and the mechanisation of farming, horses are rapidly decreasing in numbers. There are now about 1,000,000 on farms.

England has long been famous for *wool* of excellent quality—so excellent that there was still, until very recently, a small export for special purposes to the United States—and sheep number over 20 million. There is a somewhat remarkable specialisation, and distinct breeds tend to be strictly localised. The famous Lincoln and Leicester breeds are localised to a considerable extent in those counties; the Southdown on the chalk downs of the southern counties; the Romney Marsh on that damp flat stretch in southern Kent. The chalk downs afford

some of the finest pasture in the country ; the sheep which are bred on the rough hill pastures of Wales and Scotland tend to be inferior in the quality and yield of both wool and, sometimes, mutton. It is, however, dangerous to generalise too far, since "heather fed" Scottish mutton has a very high reputation.

There are roughly half the number of *cattle* as of sheep, but in Ireland cattle outnumber sheep, for the damp pastures of that island are pre-eminently suited to cattle rather than sheep. Broadly speaking, half the cattle in the British Isles are classed as "beef cattle," half as "dairy cattle." In Great Britain the dairying industry is directed in the first instance to supplying the huge demand for milk and, secondly, for butter and cheese. Formerly the seats of the dairying industry were dictated by the existence of suitable rich, damp pastures ; latterly the prime factor is one of markets and marketing arrangements—hence the now very important dairying industry in the dry eastern county of Essex near the great metropolitan area of consumption.

Although there are more than  $3\frac{1}{2}$  million *pigs* in Great Britain and nearly  $1\frac{1}{2}$  million in Ireland, the bacon industry is not as prosperous as it should be, and pork and ham are of greater importance than bacon.

**Fisheries.**—The fisheries of the United Kingdom employ about 62,000 men—or in all give employment to double that number. The annual catch is about a million tons, worth about £15,000,000, but a considerable proportion of this is from distant waters. Herrings comprise half the catch, cod 15 per cent., and haddock 10 per cent. More than a quarter of the whole catch is exported. By far the richest fishing grounds are in the North Sea, so that the leading fishing ports—Grimsby, Aberdeen, Hull, Yarmouth and Lowestoft—are all on the east coast. The pilchard fisheries were formerly important off the south-western peninsula ; there is a considerable amount of fishing in the Irish Sea (port : Fleetwood). Oysters are important at Whitstable and on the Essex coast.

**Population.**—At the census of 1931 no less than 80 per cent. of the population of England and Wales (32 million out of 39·95 million) were classed as "urban," leaving only 20 per cent. rural. The latter percentage is steadily decreasing. In Scotland the corresponding percentages are 80·1 and 19·9.

In England and Wales no less than 47 boroughs (and in Scotland 4) were found in 1931 to have populations exceeding 100,000—more than in India, with a total population of 340,000,000.

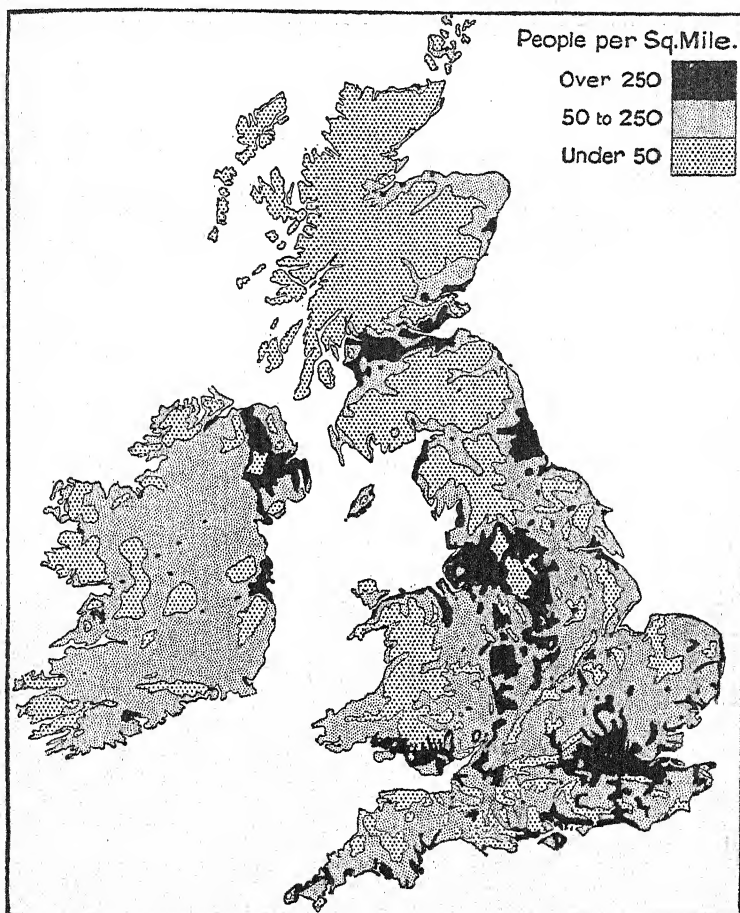


FIG. 110.—The population of the British Isles.

The three divisions correspond roughly with industrial, good agricultural and poor agricultural.

In Great Britain only about 8 per cent. of the population are farmers; by far the greater number are concerned with manufacturing industries, commerce, and transport service.

A hundred and fifty years ago when agriculture was the leading occupation, the only thickly populated counties of England and Wales were the agricultural lands of the south-east and Midlands. With the coming of the Industrial Revolution the coalfields became the areas of densest population, and to a large extent have remained so up to the present day. It is difficult to get from the census of Britain a proper idea of the size of towns because of the somewhat peculiar divisions which are adopted: thus the city of Manchester had a population in 1931 of 766,000, but the county borough of Salford is really an integral portion of the same thickly populated area, and its population ought really to be included with that of Manchester; hence it is better to consider for England the population of what are known as conurbations, a group of urban areas which are situated close together. The leading conurbations which ought to be studied from the geographical standpoint are Glasgow and Clydeside, Liverpool and Birkenhead, Manchester, Leeds, Newcastle and Tyneside, Birmingham, Swansea, Cardiff, Hull, and London. The concentration of most of these great urban areas on or near the coalfields needs no comment, but with the increasing use of electric power there is now a marked tendency to decentralisation. Many industrial centres are no longer situated on the coalfields, and in particular there is a marked increase in the industrial region of the south of England.

**Manufactures.**—Two features are characteristic of the distribution of manufacturing industries in the British Isles. One is the marked coincidence of the great industrial areas with the coalfields, and the other is the marked specialisation of individual areas. The first point will be made clear by comparing Figs. 111 and 100. It is true that the increased use of electricity, in particular, is promoting decentralisation, but the change is only beginning to be widely manifest and is marked by the increasing importance of factory industries in the south-east around London. The second point is illustrated very roughly in Fig. 111.

**Textiles.**—The products of the various textile industries make up nearly 40 per cent. of the total value of British exports of home origin (1909-13 and 1924). The percentage was 30 in 1934.

The *cotton industry* is the greatest yet in England; the spinning and weaving of cotton are almost restricted to the west side of the Pennines, mainly to that part of Lancashire which lies south of the Ribble, and in Scotland to Glasgow and other manufacturing towns of the west. Manchester (with Salford) is the great business centre; Oldham and Bolton are

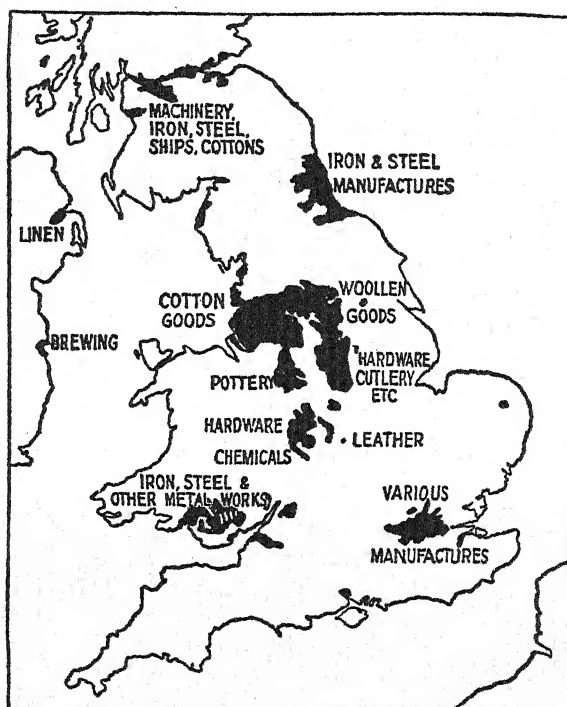


FIG. 111.—The industrial regions of Great Britain.

Notice that they are nearly all situated on coalfields.

great spinning towns, whilst Burnley, Blackburn, Preston, Bury and Rochdale are weaving towns. For its supplies of raw cotton Lancashire is still mainly dependent on Liverpool, but supplies come also direct to Manchester by the Ship Canal.

The *woollen industry* is centred in the West Riding of Yorkshire, especially around the business and clothing centre Leeds.



The narrow dales to the west of Leeds are filled with larger or smaller manufacturing towns engaged in the industry, for the most part established in the Middle Ages when suitable water for scouring, supplies of fine, lustrous wool from the neighbouring moorland pastures, and the low cost of living, were the great advantages offered by these locations. Bradford is the great worsted centre; other towns engaged in various branches of the woollen industry are Halifax, Huddersfield, Dewsbury, Wakefield and Barnsley, with hosiery in the Midland towns such as Nottingham and Leicester. In Scotland several towns in the basin of the Tweed (Galashiels, Hawick and Selkirk) are famous for the fabrics known as "tweeds." Other woollen manufactures are carried on in towns of the coalfield regions. In Ireland woollen manufacturing is largely limited to Belfast.

The *silk industry* is pursued mainly in Derbyshire and the neighbouring parts of Staffordshire and Cheshire, at Derby, Ilkeston, Chesterfield, Macclesfield, Congleton and Leek. The output of silk goods is now less than that of artificial silk, and in view of the fact that many cotton and woollen firms now manufacture the latter, it is widely distributed.

*Jute fabrics* are manufactured mainly at Dundee.

**Iron and Steel.**—Iron and steel and their products make up nearly 20 per cent. of British exports of home origin, although the "heavy industries" have suffered a period of depression since the war, from which they have not yet wholly recovered. The chief seats of iron-smelting are at and around Middlesbrough (N. Yorkshire) and South Durham; in South Wales, at Cardiff and Port Talbot; in North Lancashire and Cumberland (Barrow, etc.); and on the Midland iron fields. In connection with the manufacture of articles made from iron, two towns in England are especially noteworthy—Birmingham and Sheffield (each with the surrounding district). Shipbuilding is associated with the iron and steel industry especially in the Clyde area, the chief seat of shipbuilding in all its branches in the world; along the Tyne, Wear, Tees and at Belfast. Railway rolling stock is manufactured at works the location of which is largely determined by the requirements of the railway companies concerned—at Crewe, Swindon, etc. The motor-car industry is especially important at Coventry, Birmingham and Oxford. The tin plate industry is centred at Swansea on the South Wales coalfield.

**Other Industries.**—The making of earthenware and porcelain is associated with the "Pottery towns" of Stoke-on-Trent and neighbours on the North Staffordshire coalfield. Alkalis, chemicals and glassware are important in Cheshire (associated with salt deposits) and South Lancashire (St. Helens, Warrington, Widnes, etc.), Teesmouth (Billingham) and Tyneside. The leather industries are important at Northampton, Leicester, Stafford and other Midland towns. Paper is manufactured especially where conditions are suitable for the receipt of the bulky raw material and where there are adequate supplies of pure water. North Kent and the Thames estuary have become leading areas.

**Communications.**—Inland waterways, if we except the very important Manchester Ship Canal, are relatively unimportant in the British Isles, and only carry about  $\frac{1}{25}$ th of the traffic handled by the railways. Great Britain has 20,400 miles of railways, grouped since 1923 into four systems—the London, Midland and Scottish (7,464 miles in 1923); London and North Eastern (6,464 miles); Great Western (3,765 miles); and Southern (2,129 miles). It is impossible here to give details of the railways; they should be studied in relation to their direction from the great focus, London, and to the great ports which they serve. The increased efficiency of motor transport and the very excellent road system of the British Isles have led, in the last few years, to greatly extended use of the roads both for passenger and goods traffic.

**Ports.**—Fig. 112 has been drawn to show the principal ports of the British Isles. Overwhelmingly the most important are London and Liverpool, with about 40 and 30 per cent. of the foreign trade respectively. These are followed by Hull, Glasgow and Manchester.

*London* receives between 33 and 40 per cent. of the imports, deals with over 25 per cent. of the exports, and handles no less than half the entrepôt trade which is so characteristic of Great Britain. Its situation at the head of ocean navigation of a river which allows access to considerable distance into the interior, nearly opposite the greatest of continental rivers, the Rhine, no doubt determined its early growth and hence indirectly made it the capital of the country, a position which favoured

its further increase. The whole port, from the tidal limit at Teddington to the mouth between the Isle of Sheppey and Essex, is under the control of the Port of London Authority.

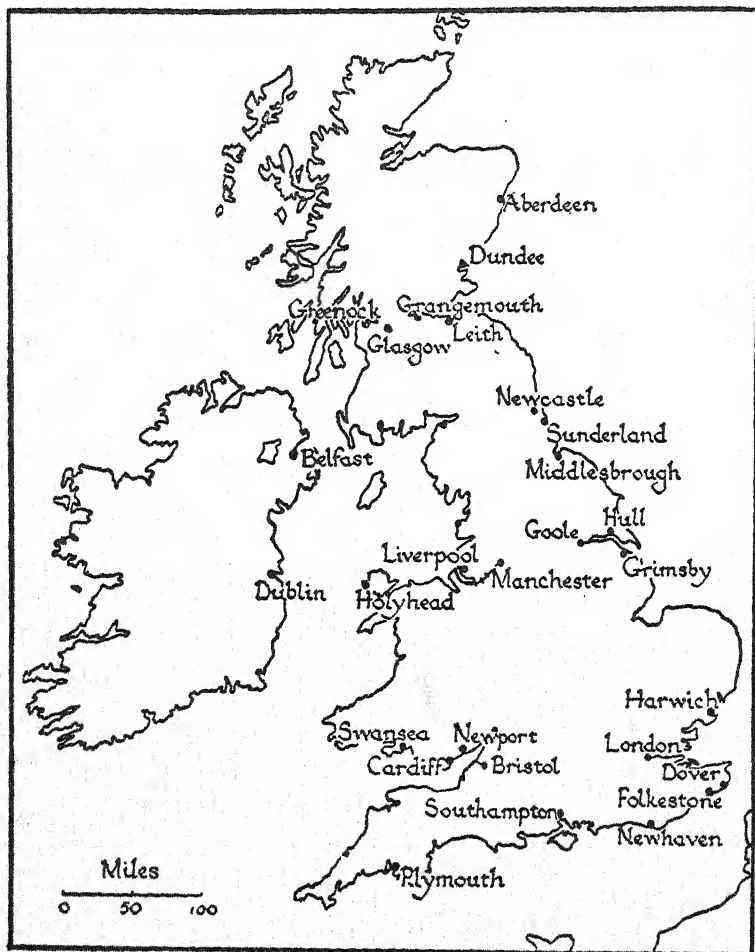


FIG. 112.—The ports of the British Isles.

Notice the favourable position of London, opposite the continent of Europe.

*Liverpool* has risen to high rank only within the last 200 years. Fig. 113 illustrates the industrial regions situated in its hinter-land, regions which are connected with the port by rail. In

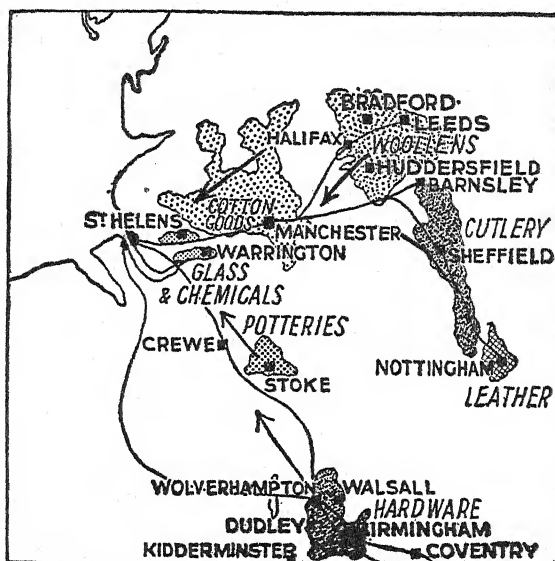


FIG. 113.—The products of the hinterland of Liverpool.

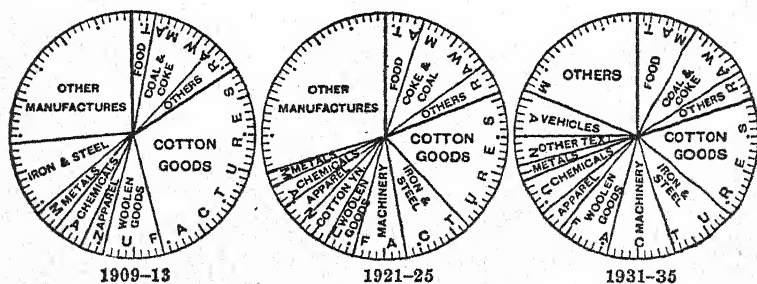


FIG. 114.—The exports of the United Kingdom.

addition it is necessary to remember the position of the Manchester Ship Canal.

*Hull* is another of the older ports of England. Most of the



### The Natural Regions of the British Isles

**The North-West Highlands of Scotland.**—The mainland of the north of Scotland may be described as the wildest and most desolate in Britain, consisting mainly of rocky mountains and heather-covered moorland and bogs. The population consists chiefly of fishermen round the coasts. The Inner Hebrides are also very mountainous and famed for their fine scenery. The Outer Hebrides are populated mainly by shepherds—the making of “Harris Tweeds” is a cottage industry—and fishermen. The Orkney Islands have, for the most part, a fertile red soil, and considerable areas are cultivated, oats, barley, hay and potatoes being grown. Shetland is famed for its shaggy little ponies, and there are many sheep and cattle on the islands. The catching and curing of fish, especially herrings, is important. The fertile red soil of the Orkneys is found also on the east coast of the mainland along the shore of Moray Firth. The lower rainfall and sunny climate encourage arable farming.

**The South-East Highlands.**—As already noted, the south-east Highlands, or Grampians, are separated from the north-west Highlands by Glen More (through which runs the Caledonian Canal used by small steamers) and extend southwards as far as the Highland Boundary Fault. The whole area is a much-dissected plateau, with a general N.E. to S.W. trend of the valleys. The Highland glens are sometimes wooded; the hills clothed with bracken, heather and coarse grass. The moors afford summer pasture to numerous sheep (the wool is woven into plaids, blankets, etc.); a few cattle are kept and a little agriculture carried on in some of the valleys. The fiorded, drowned western coast of the Highlands offers a marked contrast to the eastern coast. Here, sheltered from the Westerlies by the Grampians, is a coastal plain with stretches of fertile soil and a drier, sunnier climate suited to agriculture and cattle-rearing. Here lie the fishing ports of Aberdeen, Peterhead and Stonehaven, the first two also exporting granite.

**The Midland Valley.**—The rift valley which lies between the two great boundary faults is by no means a flat area. The fertile lowlands are broken by numerous hills marking the outcrops of volcanic rock. The Midland Valley is drained by

the Clyde and Ayr flowing westwards; the Forth and the Tay flowing from the Grampians eastwards. The Clyde is navigable by large ocean steamers to Glasgow and is linked by canal with Grangemouth on the Forth. The richest agricultural land in the Midland Valley lies in the east—especially in the Lothians, Fife and in Strathmore<sup>1</sup> around Perth. But the industrial

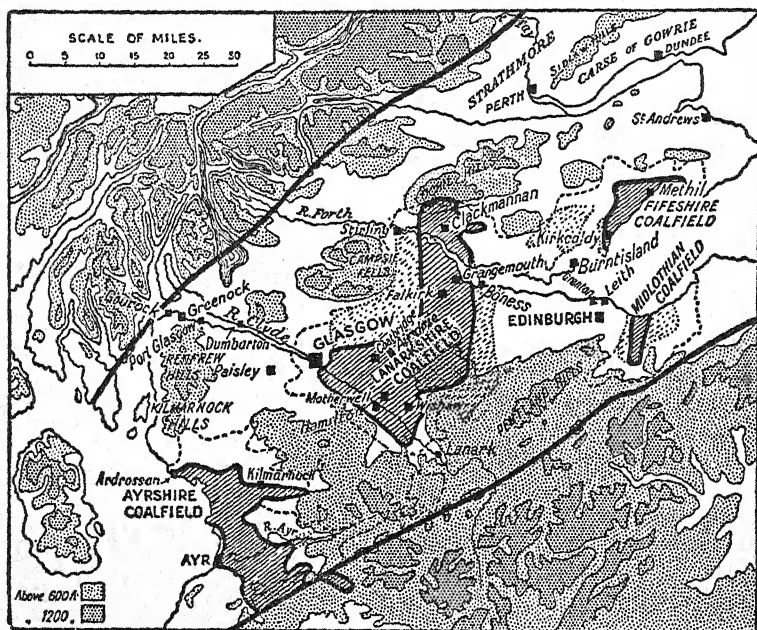


FIG. 117.—The Midland Valley of Scotland.

The pecked lines mark the extreme limits of the coalfields; the lined areas are the chief worked portions.

areas are centred on the Ayrshire, the Central and the Midlothian and Fifeshire Coalfields. On the Ayrshire field the main centres are Ardrossan and Kilmarnock, but associated with the Lanarkshire field is the great industrial region of the Clyde estuary. The iron-smelting of Motherwell, Wishaw, Coatbridge and Falkirk no longer depends primarily on local supplies of ore but on imported ore, especially from Sweden. Shipbuilding

<sup>1</sup> A "strath" is a broad river valley; Strathmore is in part the valley of the Tay.

yards line the Clyde on both banks below Glasgow—to Greenock on the south and Dumbarton on the north. The damp climate, as in Lancashire, favours cotton-spinning at Paisley, a town specialising in cotton thread. A great variety of domestic articles is manufactured at Glasgow.

Near the Midlothian field, Edinburgh, with its port, Leith, is the chief centre, and numbers paper-making, printing and brewing amongst its industries. On the Fifeshire field, Kirkcaldy, a centre of linoleum manufacture, is a leading town.

In the east of the Midland Valley, outside the coalfield regions, lie the old university town of St. Andrews and the town of Dundee. Supplies of fruit from the fertile Carse of Gowrie in the shelter of the Sidlaw Hills have led to the jam-making industry of Dundee; the demand for sailcloth, ropes and fishing nets along the coast led to the flax and hemp industries, and later to the jute industry.

**The Southern Uplands.**—The old rocks of the Southern Uplands afford but a poor soil and the region is clothed mainly with rough hill pastures. The population consists chiefly of scattered sheep farmers. Bordering the Solway Firth and the south coast are fertile plains largely devoted to dairy-farming. In the east lies the fertile valley of the Tweed. The dry pastures of the surrounding hills support sheep with a high quality wool, and hence the old-established woollen industry of Hawick, Jedburgh, Galashiels and other towns.

**The Lake District.**—The mountains and valleys of the beautiful Cumbrian massif have a radial arrangement, and the old rocks are wrapped round by younger on all sides. The heart of the massif, with Derwentwater, Grasmere, Windermere and Ullswater, is a favourite holiday resort, and Keswick, Grasmere and Ambleside may best be described as "hotel-towns." To the north-west of the old massif lies the Cumberland coalfield, with Whitehaven, Workington and Maryport; to the north-east lies the fertile valley of the Eden, with Penrith and Carlisle; to the south-west lies the iron-smelting and ship-building district around Barrow.

Geologically the Isle of Man has much in common with the Lake District and serves likewise as a holiday resort for Lancashire.



**Wales.**—Nearly the whole of Wales is hilly or mountainous, but there is a broad distinction between the complex of old rocks which makes up North and Central Wales and the coalfield region of South Wales. Between the two, on the east, is a wedge of Old Red Sandstone country, partly very fertile, but also forming the desolate moorland stretch of Brecon Beacons. North and Central Wales form a broad stretch of moorland country, with sheep-farming as the chief occupation and the population concentrated in the more fertile valleys. Holiday resorts, such as Llandudno, Rhyl, Colwyn Bay, are noteworthy along the coasts as well as inland (Dolgelly, Bala, etc.). Roofing slate is quarried at Festiniog and other localities in Carnarvonshire. On the eastward flanks of North Wales lies the Flintshire and Denbighshire coalfield. The South Wales coalfield, continued westward as the Pembrokeshire coalfield, is unique in several ways amongst British coalfields. In the first place, the household coals of the east give place westwards to steam coals and then to anthracite. In the second place, the coal seams occur at two horizons separated by a thick mass of barren sandstone known as the Pennant Grit. The latter gives rise to great stretches of barren moorland, and the colliery towns are drawn out along the narrow valleys—generally with a trend from north-north-west to south-south-east—which lie amongst the moorland. The great outlets of the coalfield are Newport, Cardiff and Swansea. Large quantities of coal are exported especially to the great coaling stations of the world, but the diminution of the coal export trade has caused much unemployment and depression. Cardiff and Port Talbot have developed iron-smelting industries; Swansea (with Llanelly and Neath) is the centre of the great tin-plate industry and is also a copper-refining centre. The tin, formerly from Cornwall, is now imported from Malaya, Bolivia and Nigeria, and much iron from Northern Spain. The old inland smelting centres of Merthyr Tydvil, Tredegar and Ebbw Vale have lost their industry to the coastal towns.

**Devon and Cornwall.**—The south-western peninsula, although another massif of old rocks, differs greatly from the Lake District or North Wales. The interior is not rugged but consists of a plateau rising gently to the granite moors which occur at intervals from Land's End to Dartmoor. The tin and copper

deposits are associated with the fringe of the granite masses of Land's End and Redruth-Camborne; the china clay with the granite mass near St. Austell. The population of the southwestern peninsula is concentrated in the coastal towns and villages; except for the valleys of Devonshire much of the interior is open farming country and contrasts strangely with the magnificent coast scenery. The warm equable Scilly Isles and the sheltered southern valleys around Penzance and Plymouth have a considerable trade in supplying cut flowers and early vegetables for the London market.

**The North of England.**—Under this title it is convenient to consider the broad Pennine uplands—treeless moorland but sparsely populated—and the busy industrial coalfield regions by which they are flanked. The uplands consist of vast stretches of Carboniferous Limestone or Millstone Grit affording sheep pastures, and now important as gathering grounds for the water supply of the great towns. The limestone scenery is especially fine in Derbyshire, where steep-sided wooded valleys lend variety to the countryside. Special importance attaches to certain of the passes through the Pennines, notably the Aire Gap and the Calder Gap, which afford communication between Lancashire and Yorkshire.

*The Northumberland and Durham Coalfield* is associated essentially with heavy industries, including shipbuilding. In addition to the smelting in the Tyneside towns, coal is also supplied to the Middlesbrough area. The Tyne is navigable by large vessels to Newcastle, but the Wear only at its mouth, hence the concentration of shipbuilding at the Tyneside towns from North and South Shields to Elswick and at Sunderland. The proximity of the coalfield to the salt mines at the mouth of the Tees has given rise to the chemical works of the Tees-mouth area (with Billingham and the Hartlepoons) and Tyne-side. The chief coal-exporting ports are Newcastle, Wallsend, Tyne Dock, South Shields, Sunderland and Hartlepool. The university and cathedral town of Durham, and Darlington with its railway works, should be noted.

*The Lancashire Coalfield* is concerned mainly with the cotton industry, of which details have already been given. Engineering works have arisen for the purpose of supplying the cotton-mills with machinery. Wigan is the chief coalfield town. Near

the Manchester Ship Canal are numerous towns engaged in chemical industries and glass-making.

*The Yorkshire Coalfield* is associated essentially with the woollen industry and, farther south, with a variety of iron and steel manufactures, of which the cutlery of Sheffield is most famous. The Yorkshire field continues into Nottinghamshire and Derbyshire, and at the southern end lies Nottingham, with its lace, hosiery and leather industries.

*The Midland Coalfields* of North Staffordshire, South Staffordshire, Warwickshire and Leicestershire are each associated with industrial development. *North Staffordshire* is the pottery region—using local clays and fireclays as well as china clay from Cornwall. The *South Staffordshire* Coalfield supplies the fuel of the famous “Black Country,” of which Birmingham is the centre, and which manufactures a great variety of hardware or small iron goods. There is marked specialisation amongst the various towns—Dudley in screws, Wednesbury in nails, Redditch in needles, Wolverhampton in cycles, etc.; Birmingham has a greater variety, including electroplated goods, brass ware, bronze ware and cheap jewellery. The principal centres of the *Warwickshire* field are Nuneaton and Tamworth, but the manufacturing town of Coventry, with its machinery, motor and cycle factories, lies just to the south. The *Leicestershire* field has no great manufacturing town, but near by is Leicester, with its woollen, hosiery, lace and leather industries. Although they lie scattered amongst and largely covered by the agricultural lands of the great midland plain, we may here note to the west of the South Staffordshire field the coalfields of Shropshire with the old-established iron industry of Ironbridge, and the Wyre Forest field with the important linen, woollen and carpet-manufacturing centre of Kidderminster.

**The Midland Plain.**—A great part of the heart of England is occupied by rocks of Old Red Sandstone, Permian, and especially of Triassic age, which weather to fine rich red soils suited especially to permanent pasture and hence to dairy-farming. Cheshire in particular is a highly developed cattle and mixed farming county; barley, oats and wheat are widely grown over much of the Midlands. Herefordshire is famous as a fruit and hop county, and in its orchards is linked with the stretches of similar soil in Somerset. It has already been

mentioned that some small coalfields lie amidst the Midland Plain ; in the south-west are others—the Forest of Dean, Bristol and Somerset fields. Most of the towns in the Midland Plain have been, and often are still, market towns serving the needs of the neighbourhood. It is not difficult to see how such industries as the leather industry of Northampton have been fostered by local supplies of raw material. Special mention must be made of the old port and industrial area of Bristol ; associated since early days with the West Indian and American trade, and to this day connected with sugar, tobacco, cocoa and chocolate.

**The Scarplands of South-Eastern England.**—Although including in its midst the great Metropolis of London, the south-east of England is pre-eminently the agricultural region of Britain. The region as a whole may be said to be bounded on the north-west by the scarp formed by the lowest Jurassic limestone—not always geologically of the same age—which overlooks the Midland plain. The Jurassic limestones give rise to one, two or three ridges each with a steep scarp face north-westwards and a gentle dip-slope eastwards. The dip-slope passes into a “clay vale” bounded by another scarp face. Passing Londonwards the best-marked escarpment of all is made by the chalk which lies above all the Jurassic beds and forms Salisbury Plain, the Chiltern Hills, the East Anglian Heights, the Lincolnshire Wolds and Yorkshire Wolds. In the counties of Surrey, Kent and Sussex the beds have been folded upwards into an elongated dome and the chalk cover removed from the centre, thus giving rise to the well-known Weald. North of the wealden uplift lies the Thames Basin filled with later rocks—mostly soft clays and sands—to the south-west of the Weald is the Hampshire Basin. Certain broad stretches of alluvium interrupt the succession of limestone ridges and clay vales—notably the large area of the Vale of York centring at York itself ; the Fenlands around the Wash and Romney Marsh in Kent. Broadly speaking, the limestone ridges afford sheep pastures ; the clay vales agricultural and cattle country. It is in this part of England that one sees the “close,” rich country of small fields separated by hedgerows and cut up by scattered fragments of woodland, which is so essentially “English.” Nearly all the towns one might mention have served their

purpose as market towns for the country around. Certain industries which started as cottage industries have survived—such as the “broadcloth” of Stroud, Bath, Frome, etc., using

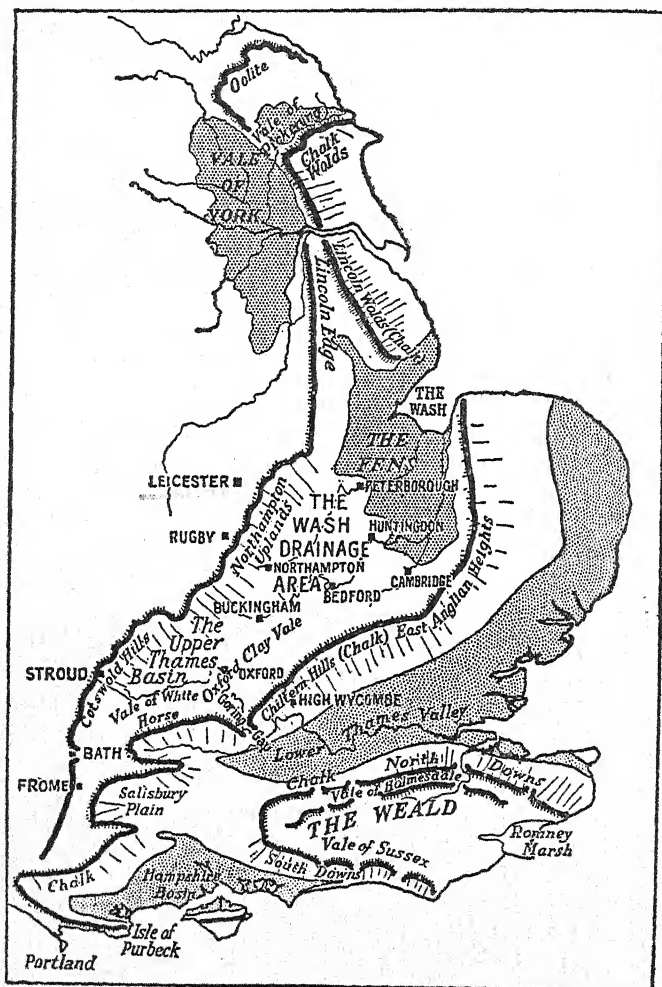


FIG. 118.—The scarplands of South-Eastern England.

The main areas of alluvium and the two great Tertiary basins are dotted.

wool from the neighbouring Cotswolds ; whilst it is not difficult to see the reason for the manufacture of farm implements at Norwich.

The phenomenon which is London is gradually affecting the greater part of south-eastern England. High rentals and high rates are encouraging decentralisation and the consequent industrialisation of such surrounding towns as Slough, Reading, Oxford, Swindon, Southampton, the Medway Valley towns, Colchester and Ipswich. The ports of Southampton, Newhaven, Folkestone, Dover and Harwich are mainly outports of London ; much of the prosperity of Bournemouth, the Isle of Wight, Worthing, Brighton, Eastbourne, Ramsgate, Margate and Southend depend upon their use as holiday resorts or, in the case of the nearer ones, as dormitories by Londoners.

The hidden coalfield of East Kent, now being developed, may result in great changes in what is at present a quiet rural district.

**The Channel Islands**, including Jersey, Guernsey, Alderney and Sark, are administered according to their own laws and are not bound by the Acts of the Imperial Parliament unless specially named in them. Half the arable land is under potatoes, and the islands supply Great Britain with products to the value of between £3,000,000 and £4,000,000 annually, consisting principally of tomatoes, early potatoes, grapes, fresh flowers and granite. The islands are favourite holiday resorts.

### Northern Ireland

Northern Ireland corresponds to the old province of Ulster without the counties of Donegal, Cavan and Monaghan. The area is 3,350,000 acres and the population (1926) 1,256,000 ; hence it is more densely populated than the Free State. The great Antrim plateau is formed of sheets of basalt (the columnar basalt at Giant's Causeway is world famous) whilst the Mourne Mountains are of granite. The most important parts of Northern Ireland are the broad fertile valleys of the Lagan, Bann and Foyle, where oats and flax are leading crops. Belfast is the capital and largest town, and carries on shipbuilding (using imported iron), flax-spinning, linen-weaving, cotton-weaving and distilling. Londonderry (Derry) is also a textile town.

The value of the linen export (going outside the United Kingdom) may exceed £10,000,000.

### Part 3. EIRE (THE IRISH FREE STATE)

**General Considerations.**—Southern Ireland formed itself into a republic in January, 1919, and the status of the Irish Free State—as a self-governing Dominion within the British Commonwealth—was decided by a treaty which was signed with Great Britain in December, 1921. With an area of about 26,000 square miles, it covers the greater part of the island of Ireland, but its population is only a little over 3 million; five times as extensive as Northern Ireland but with only a little over twice the number of people. The capital, Dublin, is the only city with over 100,000 inhabitants; it has 317,000.

**Physical Features.**—The Irish Free State consists of a central plain, which, although not low-lying, has a limestone basis which has been deeply covered by boulder clay and other material left by the Ice Sheet of the Great Ice Age. As a result of this the drainage is poor, large parts of the surface are covered with bog or with stretches of wet, boggy moorland. There is an irregular rim of high ground with the lofty Wicklow Mountains in the south-east; the irregular east-west ridges of County Kerry and others in the south-west; and irregular highlands, some of them resembling in character those of the Highlands of Scotland (including the mountains of Connemara, Mayo and Donegal), in the west and the north-west.

**Structure.**—The highland masses of the rim consist of old rocks, hard and yielding but poor soil, so that settlement and cultivation must of necessity be restricted to the valleys. Ireland is unfortunate in possessing very little coal of importance and very few minerals. It is a fortunate circumstance that the longest river in the British Isles, the River Shannon, which drains the greater part of the Central Plain of Ireland, could drain an area which is not a lowland but, as already stated, a low plateau. From the edge of this plateau it drops a distance of a few miles approximately 110 feet to sea-level in the neighbourhood of Limerick; this fall of the river Shannon has been utilised in the Shannon Power Scheme, which now

provides electric power available for the whole of the country and makes possible the development of industry independent of imported supplies of coal.

**Climate.**—Being to the west of Great Britain, Ireland enjoys on the whole a mild climate, rarely getting those periods of winter cold which affect the east of England. Over large parts of the south and west both snow and frost are comparatively rare. On the other hand, again because of its westerly position, Ireland gets a large share of rain. It has no very lofty ranges of mountains to intercept the rain-bearing winds, with the result that the whole of the country is well watered. Not only is the rainfall considerable, but there is a high proportion of what may be described as damp days; the effect of this marked humidity is seen on the vegetation, notably the grass, which remains constantly green and has gained for Ireland the name of the Emerald Isle.

**Vegetation and Agriculture.**—Nature, through the humidity of the climate and the considerable stretches of ill-drained land, has dictated that, on the whole, Ireland should be a grassland and a stock-raising country rather than an arable cultivated country. Thus forests cover a very small part of the country, permanent grass a very large part. It is a common mistake to believe that the central plain of Ireland is a great dairy-farming area: it is not. The bogs interrupt the country too much for the necessary network of communications to be made available for linking up dairy farms. Instead the Central Plain of Ireland is devoted particularly to the rearing of beef cattle, large numbers of which are shipped as live cattle to the British market for final fattening on British pastures before being slaughtered for veal or beef. Other parts of the Central Plain, particularly near Dublin, are famous for their breeding of fine quality horses as hunters and racing animals.

Despite the humidity, everywhere on the hilly margins where, of course, the ground is better drained, are large numbers of sheep. It is in the south-west where there is a succession of fine, fertile valleys separated by barren ridges that the dairy-farming industry has been organised extraordinarily well on the co-operative basis and where large quantities of butter are produced. The urban centres of this south-west are Cork



and Limerick, and in the immediate hinterland of Limerick is the famous Golden Vale, with some of the finest pastures in the whole country. As a subsidiary to the actual production of butter there is the rearing of pigs, particularly pigs for bacon, as a means of utilising the skimmed milk.

Referring to the crops of the Irish Free State, by far the most important is oats, followed by potatoes and root crops, with barley a long way behind, almost exclusively in the driest part of the country, that is, on the well-drained soils of the south-east. Wheat occupies but a very small acreage. It is, however, the present policy of the Irish Free State Government to develop economic self-sufficiency, and so crop farming is being encouraged, and so are manufactures.

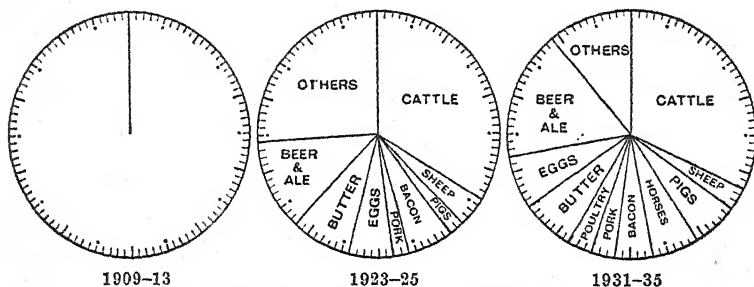


FIG. 119.—Exports of the Irish Free State.

**Trade and Manufactures.**—If we glance, therefore, at the foreign trade of the country we find that agricultural produce represents 70 per cent. of the whole, with a remarkably high place taken by live animals. In this the export trade of Ireland is unique, and it illustrates at once the importance of the British market to Ireland. Of the manufactured goods the chief of importance are stout (made at the famous breweries of Guinness's at Dublin) and whisky. The requirements of the Irish Free State, on the other hand, are essentially manufactures and those foodstuffs which are grown in tropical countries or the grain for the bread of the people. Normally over 90 per cent. of the trade of the Irish Free State is with the United Kingdom; this percentage was lowered by the unfortunate quarrel between the two countries in the years preceding 1938.

### Part 4. BRITAIN IN THE MEDITERRANEAN

That great inland sea, the Mediterranean, is almost an enclosed sea; its connection with the open Atlantic is through the narrow straits of Gibraltar, through the "Pillars of Hercules" of the ancients, guarded on the north by the rock peninsula fortress of Gibraltar, and on the south by Tangier. *Gibraltar* is of course a British possession and is heavily fortified and has a large protected harbour. It has an area of only  $1\frac{1}{4}$  square miles, and a large part of this is extremely hilly and quite uninhabitable. The hill land is valuable as it is used as a



FIG. 120.—The Mediterranean Sea.

gathering ground for water-supply, rendering the tract self-supporting in this respect. Tangier may be noted on the far side of the Straits of Gibraltar as now being international—under the joint control of Britain, France and Spain.

The Mediterranean falls roughly into a western basin and an eastern basin; between the two it narrows and there is a comparatively short distance between the island of Sicily (Italian property) and the northern coast of Africa, where Tunisia is in the French zone of influence. Midway between these two points and guarding the approach from the western to the eastern basin lie the tiny islands of *Malta and Gozo*,

again a British possession. Malta has a magnificent, deep natural harbour at Valetta. At the far end of the Mediterranean, that is, at the eastern end, Britain owns the large Turkish- and Greek-speaking island of *Cyprus*, a possession which has been up to the present comparatively little developed. It has a Mediterranean climate, perhaps rather an indifferent one, with great heat in summer and intense cold in winter.

On the Asiatic shores of the Mediterranean Britain holds a mandate from the League of Nations over the former Turkish territory of the Holy Land, or *Palestine*, a tract of country rather larger than Wales with a population rather over a million. By the famous Balfour Declaration of 1917 the British Government expressed its sympathy with the view that Palestine should be made a national home of the Jews, and this is the policy of the Administration, bearing in mind the essential importance of protecting the rights of the Mohammedan inhabitants who constitute two-thirds of the population and of the Christian minority. Although it is only small, Palestine consists of three north-south strips. The first is a coastal strip of considerable fertility enjoying a good Mediterranean climate, in which there is a large production of the famous Jaffa oranges; here are the ports of Jaffa, an open roadstead, and the port of Haifa, farther north, which has recently been very much improved and which is becoming a centre of heavy industry. Near Jaffa the Jews have built the remarkable town of Tel Aviv, rapidly developing a great variety of manufacturing industries. The second strip, running north to south, is the hill country, parallel to the first. In the north of this region lies the famous old village of Nazareth, whilst in the south, at a height of 3,000 feet, is Jerusalem. To a considerable extent it is an upland tract of bare limestone hills or rounded chalk hills on which sheep and goats find pasturage and where with difficulty olive trees are established in the more fertile valleys. Then the third strip is that remarkable valley, occupied by the river Jordan, the Sea of Galilee and the Dead Sea, the latter with its surface no less than 1,292 feet below sea-level. In this curious depression naturally the air pressure is extremely high and the temperatures are high so that frost is entirely unknown in the winter. Being cut off from the westerly rain-bearing winds makes it very dry, actually a desert tract, but water being available from the Jordan, irrigation is possible except in those

parts where the ground is impregnated with salt. Of recent years the working of salt near the Dead Sea has become an important industry, whilst power works on the Jordan are now supplying much of Palestine with electric light. Beyond the Jordan is a fourth strip which, actually, is outside Palestine and constitutes the plateau and the margin of the great Arabian desert, which is *Trans-Jordania*. Trans-Jordania is under the same administration as Palestine, but it is not part of the home of the Jews. It is inhabited in the main by Arabs, either settled or nomadic, who are at the same time Mohammedans.

At the eastern end of the Mediterranean, forming a connection between the Mediterranean Sea and the Red Sea, and so leading from Europe to the Indian Ocean and the Far East, is the *Suez Canal*, roughly a hundred miles long, passing through flat, desert country in such a way that no locks are necessary. It is often believed, apparently, that the Suez Canal is British property; that is not the case, of course. The Suez Canal Company is an international company, in which the majority of shares are held by the French, but in which the British Empire has a holding through the British Government. The Suez Canal is open on equal terms to the ships of all nations. It lies actually in the territory of Egypt, and this is a major reason why Egypt has remained within the British sphere of influence, though not part of the British Empire.

## Part 5. BRITAIN IN THE INDIAN OCEAN

The Indian Ocean has, perhaps facetiously, been called a British Lake. It differs from the other oceans in being closed to the north, and there we find the great territory of India, with its neighbour Burma. Almost off the southernmost point of India is the considerable island of Ceylon situated in such a way that its principal town and port, Colombo, is a natural meeting place in the midst of the ocean. This situation has earned Colombo the nickname, probably unknown there, but familiar in geography books, of the "Clapham Junction" of the Indian Ocean. The western side of the ocean is, of course, bounded by the great continent of Africa. Here we notice a succession of British territories, British Somaliland in the far north, in the desert zone; then Kenya, with Zanzibar, a small

island; the mandated territory of Tanganyika. Portuguese territory interrupts the succession until we reach South Africa, where Natal faces the Indian Ocean.

The approaches to the Indian Ocean from Europe are naturally through the Suez Canal and the Red Sea, and here we have Britain owning not only the tiny island of Perim, in the entrance to the Red Sea, but also the important coaling station of *Aden* on the coast of Arabia. In the Persian Gulf Britain has pos-

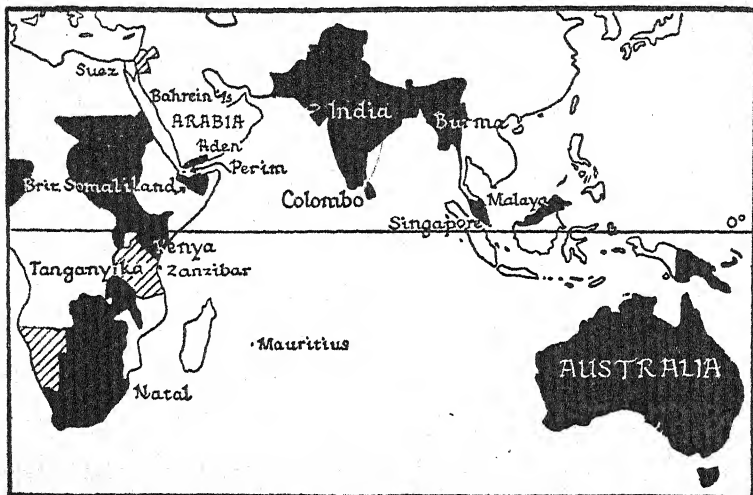


FIG. 121.—The Indian Ocean.

British territory in black (mandated areas lined). Note: the northern half of the area shown black in New Guinea is mandated.

session of the *Bahrein Islands*, and in addition has political interests over parts of the mainland of Arabia.

In the southern Indian Ocean the position of the island of *Mauritius*, with its big production of sugar, should be noticed, whilst there are other scattered groups of islands which are coloured red on an Empire map.

Turning to the eastern side of the Indian Ocean there is *British Malaya*, then the all-important focus of *Singapore*, and then a gap until the great island continent of Australia is reached. Thus we see that British territory almost surrounds

the Indian Ocean, and the natural meeting place in the centre is in the British island of Ceylon.

### Part 6. CEYLON

The pear-shaped island of Ceylon, with an area of 25,000 square miles, is about half the size of England. Its rapidly

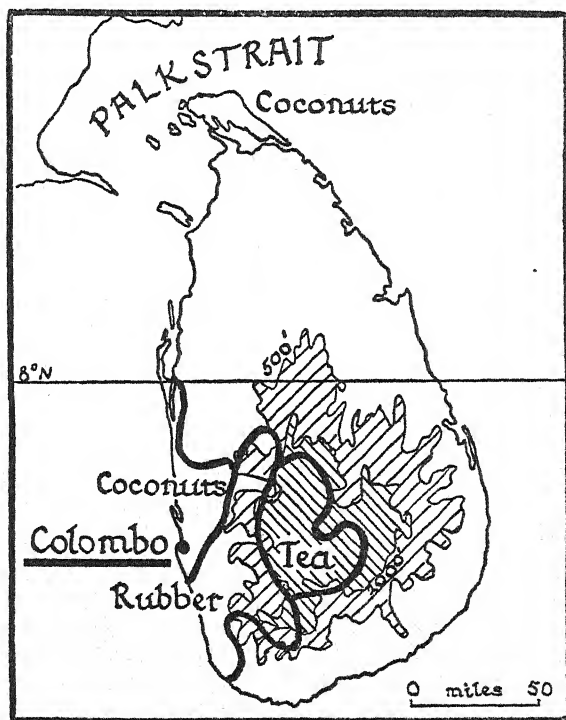


FIG. 122.—Ceylon.

increasing population numbers 5½ million and it is now a Crown Colony with a considerable measure of self-government. The importance of Ceylon's position in the heart of the Indian Ocean is reflected in its interesting history, having come under the sway of Portugal and Holland at different times within the last three hundred years.

Physically it consists of a central knot of mountains with a surrounding rim of undulating lowland, most extensive in the north, usually bordered by a succession of lagoons and then sand-dunes along the coast itself. The whole mass of the centre consists of the same ancient rocks which make up the plateau of peninsular India, and so are important locally for their minerals; the graphite is now largely forgotten, but precious stones are still obtained. Much of the northern lowland is infertile, but the lateritic soils of the south-west are particularly fertile.

The land is nearer to the equator than any part of the Indian Empire, and so in climate is almost equatorial in character, though there are two marked rainy seasons coinciding with the two monsoons. At such a place as Colombo, which is always wet and moist, the temperature varies but little from 80° F. on an average throughout the year.

Rainfall varies greatly. Where the rainfall is heavy we have an extensive cultivation of rubber; on the hills, where there is a good rainfall, are the great tea gardens; round the coast, as one might expect in such an island, the coconut palm flourishes. There is insufficient flat land to grow all the rice which the rice-eating people of the country consume, so some has to be imported. Thus rice, tea, rubber and coconuts, together with some of the famous old spices such as cinnamon, and various native vegetables, cover the bulk of the cultivated land. The principal exports are, on the other hand, tea, coconut products and rubber. It should be noted that practically all the foreign trade passes through the principal town and port of Colombo, and the details of the situation of Colombo and the construction of its artificial harbour in a protected position from the south-west monsoon should be noted.

## Part 7. INDIA

The India Act of 1935 agreed the separation of India and Burma and became effective on April 1st, 1937, and so in this section India proper alone will be considered. India proper has an area of rather over a million and a half square miles, and a population (in round figures) at the last census of 340 million. Although it is part of the great continent of Asia, India is justly

described as a "sub-continent," in that it is isolated in a remarkable way from the rest of Asia. Along the north it is cut off by a gigantic wall of mountains, the greatest wall of mountains which exists anywhere on the surface of the earth—the famous Himalayas. The average height of the Himalayas exceeds the highest points of the Alps in Europe, and the Himalayas boast,

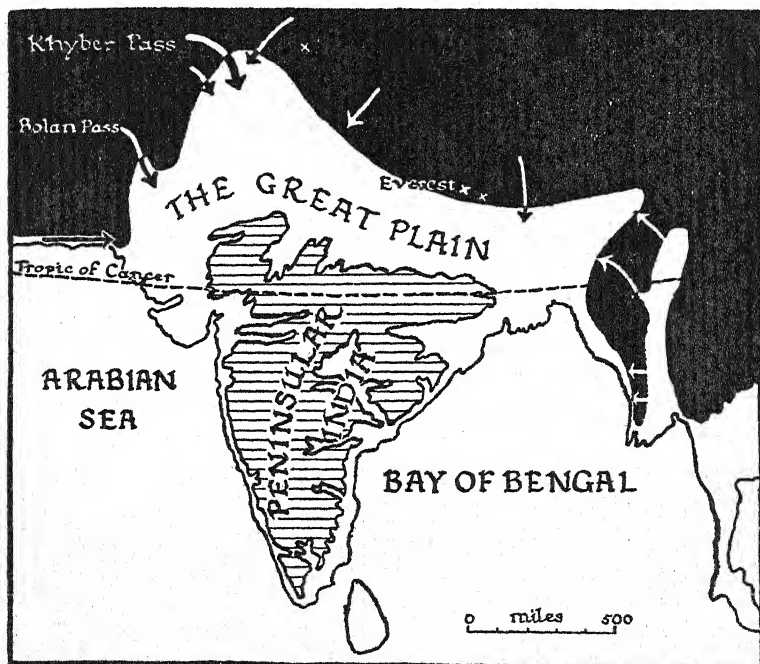


FIG. 123.—The frontiers of India.

The mountain wall is in black; the chief passes are shown by arrows.

of course, the highest mountains in the world, including Everest, 29,060 feet, and Mount Kinchinjunga, Mount Godwin Austen and many others. On the north-west the mountain chain swings round so as almost to connect the Himalayas with the Indian Ocean, and in the same way in the north-east the mountain chain swings round so as to separate India proper from Burma. The boundaries of India on all other sides are



formed by the sea. Thus India is an area isolated by nature. Through the heart of this tract runs the Tropic of Cancer, so that, strictly speaking, the northern half of India is outside the tropics and might therefore be described as a temperate land; only the southern and smaller part lies actually within the tropics. But the influence of India's wall is such that the whole is really a tropical country in which the climate is dominated by the well-known monsoon.

**Physical Features.**—We may divide India into four major sections :

- i. *The mountain wall* in the north.
- ii. *The great plain* of Hindustan or the Plain of the Indus and its tributaries, the Ganges and its tributaries and the lower Brahmaputra, the most extensive real plain in the world, with a soil of alluvium of unknown depth and over large areas an absolutely flat surface without even the sign of a hill.
- iii. *Peninsular India*, which consists of a great plateau, on the whole with its highest edge along the west and sloping therefore towards the east. Into this plateau rivers have cut considerable valleys, and for the most part the longer rivers drain towards the east.
- iv. *The coastal strips*, a very narrow one on the west, a broader one on the east made broader by the deltas of the east-flowing rivers.

**Structure and Minerals.**—Structurally India falls into four divisions which coincide with the physical divisions :

- i. *The Himalaya Mountains* are, from the geologist's point of view, young mountains : they rose and were folded at the same time as the Alps of Europe, and it is only here and there that the ancient rocks of the core have as yet been exposed. Thus we find that the Himalayas are not important from the point of view of minerals ; the older, more mineralised rocks have not yet been exposed. On the other hand, on the margins of such a chain, one learns from comparison with the Caucasus, the Rockies and elsewhere, to expect to find great oilfields. India, however, is not fortunate in this respect : there is one small oilfield in the north-west in the Punjab and one or two small ones in Assam, but production is not large.

- ii. *The Great Plain* of Hindustan, or the Great Northern

Plain, consists essentially of thick alluvium, and so forms most magnificent agricultural land, amongst the most fertile in the world, wherever there is sufficient water for cultivation.

iii. The *Plateau* consists of an enormous block of ancient rock, in places rich in minerals, including gold at Kolar; manganese, iron ore and copper ore in the north-eastern corner.

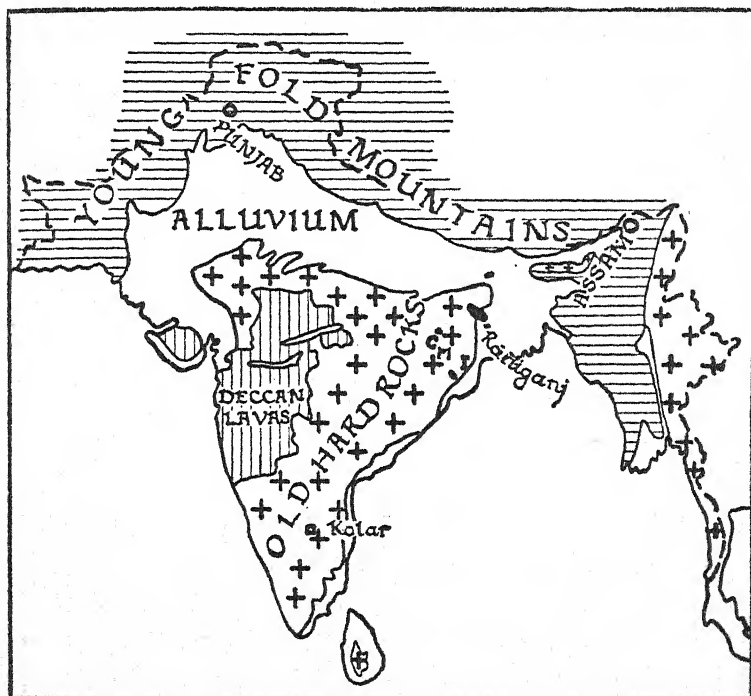


FIG. 124.—Structure and minerals.

O = oil; C = copper; M = manganese; I = iron. Coalfield in black.

At least a third of the plateau (in the north-west) is covered by huge spreads of lava, poured out from fissures in the earth's surface and whose main importance is in the dark-coloured soil which they yield, the famous black cotton soil of India. Occupying basins on the surface of the plateau, notably in the north-east, are beds of sedimentary rock which include coal-

fields. About nine-tenths of India's production of 20 million tons a year come from the coalfields of Jherria and Raniganj in the north-eastern corner.

iv. The *Coastal Strips* are again mainly alluvial and suitable for cultivation.

**Climate and Vegetation.**—It is of course known by all that India enjoys a tropical monsoon climate. Popularly the year is divided into three seasons. There is the cool season which commences towards the end of October and lasts through November and December, January and February, and which is also a dry season. But in the early part of the year, February, March and April, the land begins to heat up and the hot season, also a dry season, sets in and lasts to, to take an average date, June 15th. The air over India becomes very hot, particularly that over the northern plain, and so gives rise to a great low-pressure centre. Towards this low-pressure centre moisture-laden winds from the ocean then commence to blow, and so the monsoon breaks about June 15th (rather later farther north) and the rainy season commences. The rains last through July, August and September, and begin to dry up in the month of October. Only in the extreme north of India are there winter rains from disturbances which may have their origin in the Mediterranean, whilst on the coast of Madras the retreating monsoon causes cyclonic storms and there is considerable rainfall in November and December. Of the utmost importance to India is the amount of the rainfall. We can divide the country into zones according to rainfall :

(a) *The wet zone*, where the rainfall is more than 80 inches a year, which is normally covered with dense evergreen forest, since the moisture is sufficient to prevent the trees losing their leaves in the dry season. Where this forest is cleared the dominant crop is nearly always rice ; and rice is the principal food grain of the people. There is an abundance of moisture in this wet zone, and one of the difficulties in a low-lying area is the necessity for drainage. Canals are constructed for purposes of drainage, and banks may be necessary to enclose the rivers.

(b) *The intermediate zone*, with a rainfall of between 40 inches and 80 inches, where the natural vegetation is a monsoon forest of high trees including the valuable teak and sal, trees which

lose their leaves in the hot season as a protection against excessive transpiration. Where this forest has been cleared one gets a mixture of the crops of the dry and wet zones ; rice may be grown, but there is also a proportion of maize, millet and other dry-zone crops.

(c) *The dry zone*, with a rainfall of less than 40 inches a year,

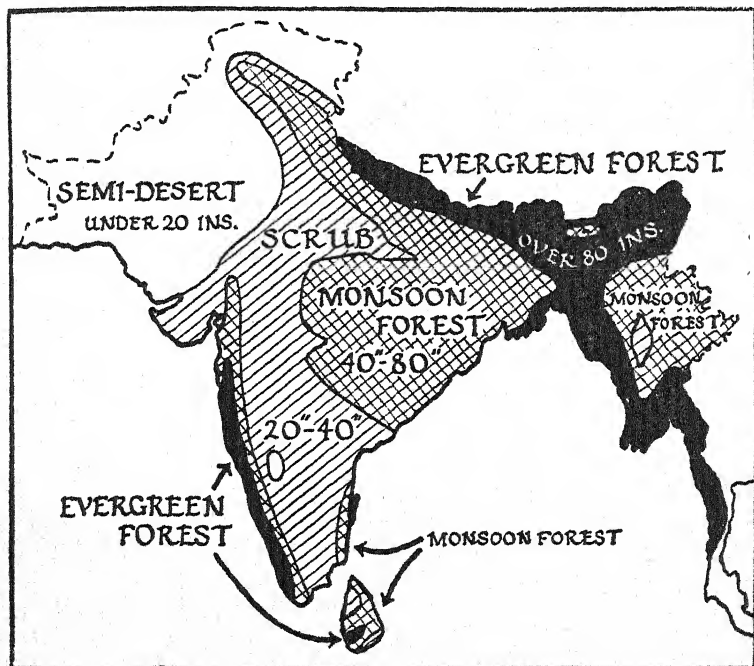


FIG. 125.—Rainfall and vegetation regions of India.

where the vegetation is naturally a poor type of forest or scrub, often of trees and bushes armed with spines to prevent their destruction by animals. In the wet season the growth of grass between the trees is encouraged and in some respects this land bears a resemblance to the savana lands of Africa. Unless water for irrigation is available the crops are the dry-zone crops—amongst the foods millet in the south, but in the cool north wheat is grown as a very important winter crop. The

chief non-food crops are cotton and various oil-seeds, including sesamum and ground nuts, the latter often on very poor, sandy soils.

(d) *The desert zone, with less than 20 inches of rainfall, where*

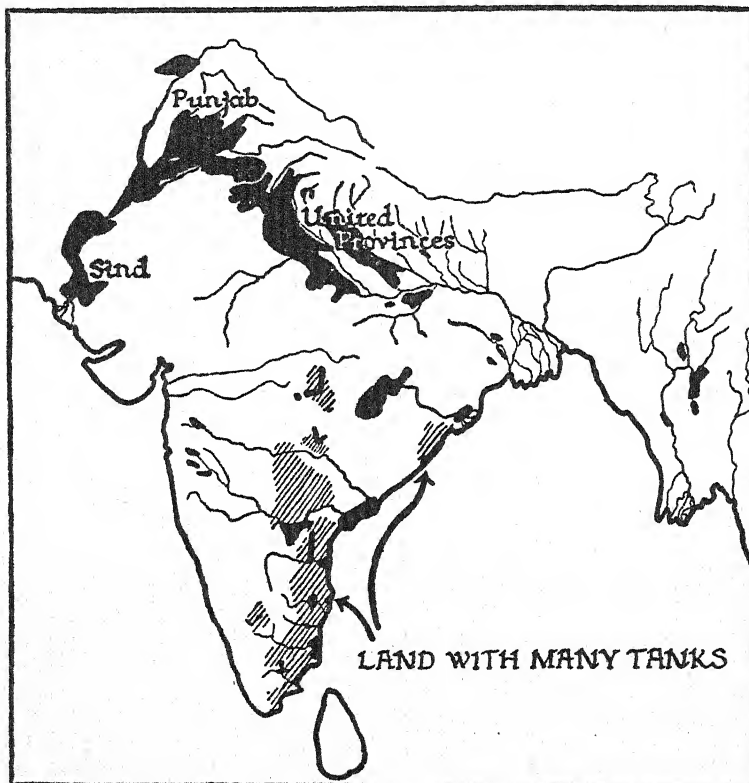


FIG. 126.—Irrigation in India.

The areas shown in solid black are irrigated perennial canals.

cultivation is virtually impossible unless water is available for irrigation. We see from this general description the enormous importance of *irrigation* in India, and Fig. 126 shows those areas which are irrigated. Notice that they are mainly in the north, where there are large tracts of flat land suitable for this

purpose and where the great rivers draining from the Himalaya Mountains have water in them all the year and can be tapped, especially in the place where they leave the mountains. The rivers in Peninsular India are not so constant, and so there is not the regular supply of water available for irrigation nor is there the same amount of flat land suitable for irrigation. Instead the people there dam the small streams with earth or masonry dams and shallow lakes which exist only in the height of the wet season accumulate behind them, and some of the water is thereby stored for a few weeks longer and can be led over the ground; this is called tank irrigation. There is also considerable irrigation in the north from wells and other sources.

**The People of India.**—It is not always realised how extraordinarily diverse are the people of India. There are greater contrasts between, let us say, the jungle tribes—the Santal of the north-eastern plateau, the stalwart, bearded Punjabi of the north-west, the lightly built Bengali of the Bengal delta, and the more stolid, slower-thinking Madrassi of the Madras area—than one would find between the people of the whole continent of Europe. There is just as much difference between the various languages of India, and hence the importance of the use of English as a common language over the whole, as a “lingua franca.” It is true that the inhabitants of India have already realised the necessity of a common language, and so Hindustani is used over the north of the country and Tamil has the same function over much of the south.

Not only is India split into divisions by the physical and linguistic differences of the people, but is also cut into marked divisions by religious differences. Hinduism may be described as the national religion of the majority of the people. It is a polytheistic religion in that it recognises a large number of gods, but perhaps more important is the division of the people into very rigidly defined castes. Many of the castes are occupational castes, so that a man born into a caste can only follow one certain occupation; and a very large proportion of the people belong to the so-called depressed classes, including the “untouchables.” Then about 22 per cent. of the people are Mohammedans, whilst 2 per cent. have been converted to Christianity. The minor religions include the Parsees or “sun-worshippers,” and in the hills there are limited numbers of animists or spirit

worshippers. It is the antagonism between Mohammedan and Hindu which is such an important factor in Indian life, and the most serious obstacles to progress are those which have their roots in religion, such, for example, as the purdah system for women and child marriage.

When we come to look at the distribution of population in

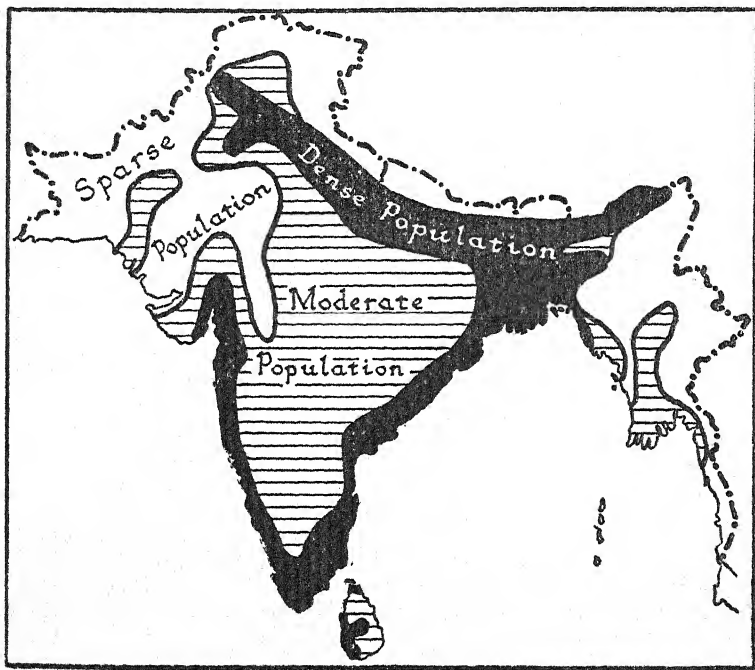


FIG. 127.—Population map of India.

India we may say that broadly speaking, as an agricultural country, it is carrying its maximum population, and the standard of living must of necessity be low. During the decade 1921-1931 the population increased by approximately 32 million, and despite the amazing improvements in irrigation and the settlement of more land, the pressure of the population on the country becomes more and more severe. If we look at the population map of India we get a good idea of the relative carrying

capacity of the various parts. The most densely populated regions are first the lowlands with a fertile soil, where the bulk of the people are agriculturalists, with especially high density on the well-watered tracts. Those lowlands which have a low rainfall have a smaller population, and dwindle to practically nil despite the inherent fertility of the soil unless water is available for irrigation. The better-watered parts of the hills and plateaus have a moderately dense population—the population decreases very much again where the rainfall is below 40 inches. There are parts of the plateau where the rainfall is not only low but also precarious, so that although in good rainfall years the land might support more, in poor years famine is the great danger.

Turning to the *occupations* of the people, the diagram annexed shows the predominating importance of agriculture. It is for the most part subsistence agriculture. In some of the better years a little wheat is produced as a surplus, and limited quantities of oil-seeds—sesamum and ground-nuts—are produced for export. The amount of land which is devoted to plantation crops, notably tea and rubber, is severely restricted. The tea is almost entirely in Assam and the neighbouring parts of the north-east and in the Nilgiri Hills of the south, whilst the rubber, in view of its climatic requirements, is almost restricted to the extreme south. In these areas there are European owned or managed plantations, but everywhere else agriculture in India is the native occupation, and the produce is essentially for local consumption.

The small maps (Fig. 129) show the distribution of the leading crops in the country, and it is to be noticed that rice is to be found mainly in those areas of heavy rainfall where there is also flat land for cultivation; it is only grown in the dry tracts

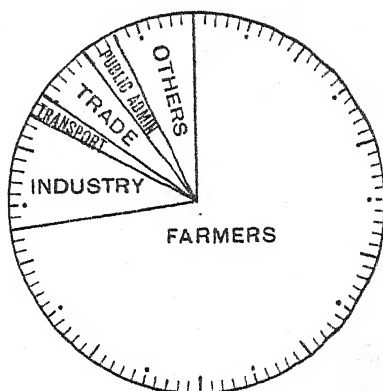


FIG. 128.—Occupations of the people of India.



where abundant water is available for irrigation. In the hotter, drier parts of the country the food grain is everywhere one or more of the millets. In the north-west and the north, which have a cool season, wheat largely takes the place of millet in the drier regions; it is grown there as a winter crop and ripens in January or February before the hot season commences.

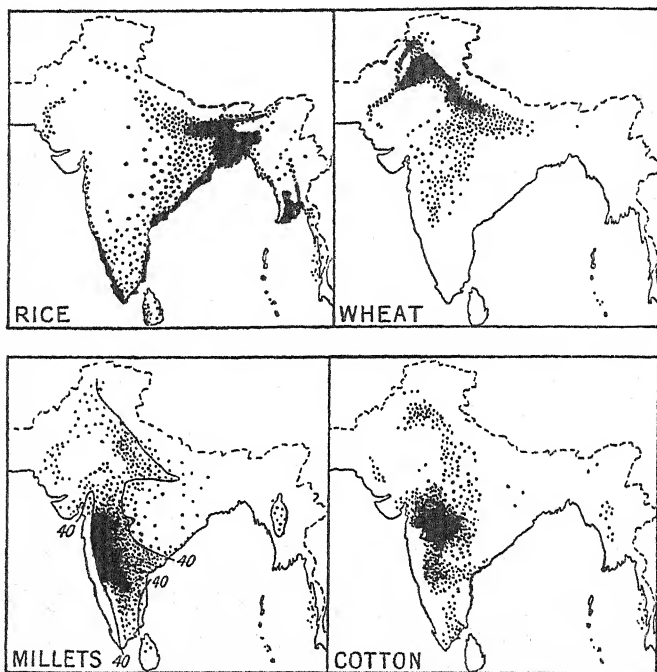


FIG. 129.—The distribution of some leading Indian crops.

Turning to other food crops—peas and beans and tobacco may be included in this category—considerable quantities of barley and maize are grown, whilst of late years sugar-cane has increased in importance, and so has the actual manufacture of sugar. Until recently India had to import a large proportion of her requirements, particularly from Java.

*Manufactures* in India are of two kinds. There are the old-established village industries, for in the old days a village was

more or less self-contained, each one had its potter and its smith and its worker in gold and silver, and so on. These native crafts have tended to die out as the bazaars have been flooded with cheap foreign articles. Thus although there has been an increase in the second type of industry, the large manufacturing industry of the towns, the total number of people listed as employed in industry has actually decreased. Amongst the leading factory manufactures come cotton-spinning and cotton-weaving, very largely centred in Bombay, which has approximately a quarter of a million cotton workers. Other cotton towns include Jubbulpore and Nagpur in the interior, near the actual cotton-growing country which is shown in Fig. 129. Notice that cotton is a dry-zone crop and also the predominating importance of the areas situated on the black cotton soil. This is the Indian short staple cotton, not as good as that grown farther north in the Punjab. Then there are the jute mills, which are situated on the river Hooghly north of Calcutta, and which manufacture canvas and sacking from the jute which is grown in the Ganges delta; this region grows nine-tenths of all the jute in the world and half of it is manufactured in these jute mill towns.

Amongst the heavy industries, India has the exploitation of its coal, and has just recently started an iron and steel industry, largely through the enterprise of the great Indian firm of Tata. The iron and steel mills are situated for the most part at Jamshedpur, about 150 miles from Calcutta.

**Communications and Foreign Trade of India.**—India is still remarkably deficient in roads and the bullock cart with its two bullocks which can go across the fields in the dry season, and which does not go at all in the wet season, is still the principal means of communication over huge parts of the country. The proper metalled roads are growing gradually; the great difficulty is their maintenance during the rainy season.

More important to date are the Indian railways. The network includes about 36,000 miles of track, the greater part of it on a broad gauge, broader than the standard English, but a considerable proportion of it on the narrow, metre gauge. Notice the arrangement of the railways; they can be regarded as radiating from each of the four great ports, Calcutta, Bombay, Madras and Karachi. Of these Calcutta and Bombay are the

more important, and it is difficult to decide which is the more significant and has the larger trade. Calcutta is a British-built city; one hundred and fifty years ago its site was an almost useless swamp: to-day it is the second largest city in the British Empire, after London, and although since 1912 Delhi

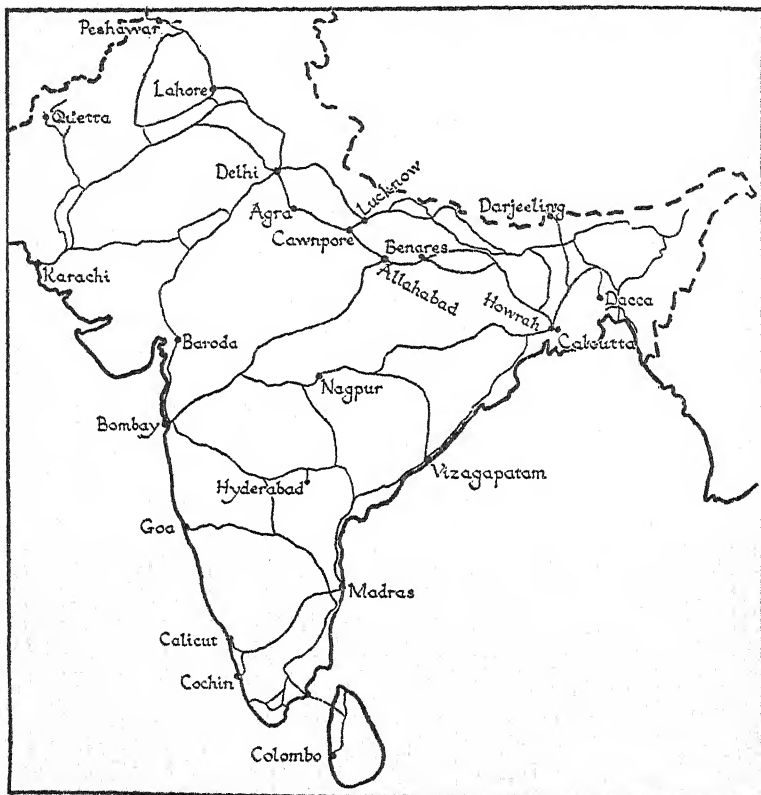


FIG. 130.—Indian railways.

has been the capital of India, Calcutta remains the commercial capital of the country. It is not situated on the Ganges river, but on the Hooghly, one of the distributaries of the Ganges. Notice that Calcutta is on the westernmost side of the delta in such a way that there is firm solid ground with few rivers to

negotiate immediately to the west. Thus the railway starts from Howrah on the western side of the river, whereas Calcutta is situated on the eastern side. The natural hinterland of Calcutta is thus the great fertile valley of the Ganges. The towns in the Ganges valley are for the most part collecting or

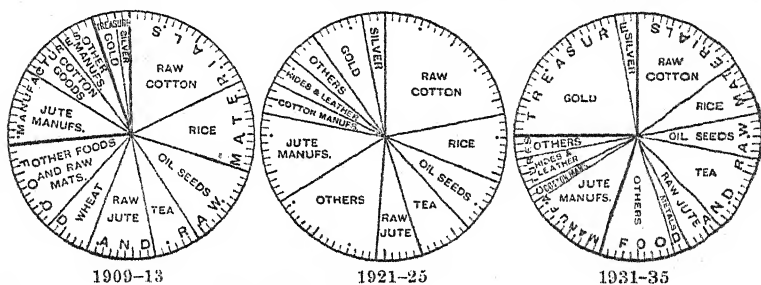


FIG. 131.—The exports of India.

distributing centres for the agricultural regions. Some of them are also seats of learning or places of pilgrimage, and amongst these may be noticed Benares, Allahabad and Agra. The tea-growing regions in the north are also in the hinterland of Calcutta.

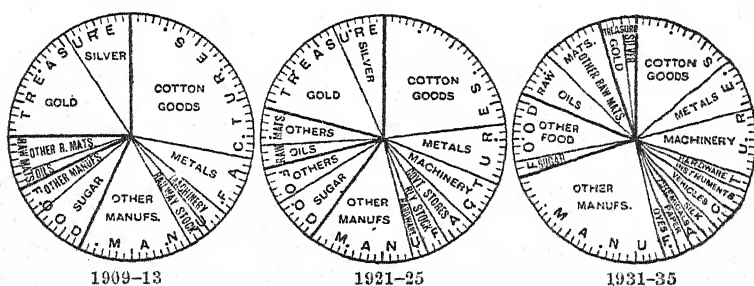


FIG. 132.—The imports of India.

Bombay claims as its hinterland the great cotton-growing region, as far at any rate as the town of Nagpur, and northwards its natural hinterland extends as far as the capital Delhi.

The Punjab is more in the hinterland of the port of Karachi, which, when there is a surplus, is the wheat-exporting port of the country.

Madras claims for its hinterland the greater part of southern India. The comparative unimportance of the smaller ports round the coast is due to the lack of harbours. Madras, formerly a very dangerous open roadstead, has now been provided with a fine artificial harbour. Another good harbour has recently been completed at Vizagapatam. The lagoon at *Cochin* has also been dredged and converted into a deep water port.

The bulk of the foreign trade of India is sea-borne. It is small in proportion to the population, measured on a *per capita* basis, simply because the bulk of the productions of the country are required by the people themselves. Thus we see the large

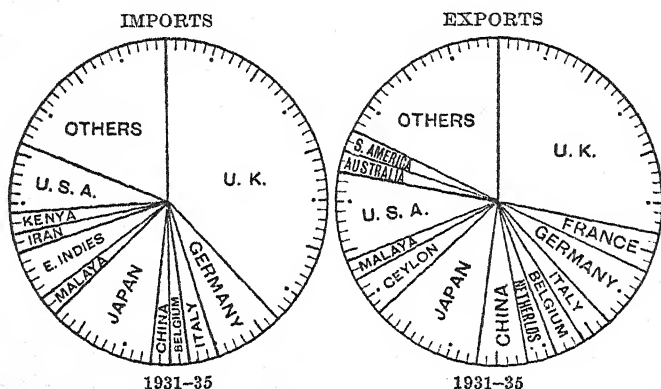


FIG. 133.—The direction of India's foreign trade.

part taken by cotton and cotton goods, jute and jute manufactures, tea and then oil-seeds. The export of rice shown is from Burma and will disappear now that Burma is separated from India and her exports will no longer be included. On the import side the requirements of India are manufactured goods which she is still unable to produce herself. A large proportion of the foreign trade is naturally with Great Britain, but most of the manufacturing countries of Europe supply their quota, and those countries which require the Indian type of cotton are also traders with her, including Japan who, in return, sends now large quantities of Japanese-made cotton goods. As elsewhere, artificial silk is rapidly spreading in popularity.

## Part 8. BURMA

Until separation in 1937 Burma was one of the provinces of the Indian Empire ; it was, in fact, the largest, having an area of a quarter of a million square miles, but it was markedly contrasted to the remainder of India in that the population of this vast area is only a little over 15 million. Under the Government of India Act, 1935, Burma separated from India ; the separation gives point to the marked contrast between Burma and India proper, and the position of the "Cinderella" province had long been an anomalous one. Burma can be described as an undeveloped monsoon country with great possibilities of expansion and economic activity. Its problems are likely to be those connected with immigration of people from over-populated India on the one hand, and over-populated China on the other. It is, however, cut off from India by a wall of mountains and from the thickly populated parts of China by a broad expanse of plateaus and mountains, so that almost the only approach to the country is by sea through its major port of Rangoon or more recently, for special purposes, by air. It is this remarkable isolation from its neighbours that has left Burma in the position of an undeveloped backwater ; even at the present day the normal way from Assam to northern Burma, a distance of 100 or 150 miles across the mountains as the crow flies, is *via* Calcutta round to Rangoon, up the Irrawaddy and so to complete the journey in about ten days.

In its physiography the remarkable feature of Burma is the north-south alignment of its ranges and its principal river valleys. From west to east there is first of all the complicated folded mountain chain of the Arakan Yoma, between which and the sea, the Bay of Bengal, there are but small plains suitable for the support of a population, the most extensive being around the town of Akyab. At present no railway nor motor road crosses these mountains. Then comes the valley of the Chindwin, somewhat narrow and sparsely populated, which is extended southwards into the valley of the lower course of the Irrawaddy. The valley of the lower Irrawaddy, through the heart of the Dry Belt, is broad and supports a considerable population, whilst the fertile delta of the Irrawaddy is the most important part of the whole country. Then

comes another line of mountains from north to south, much lower in the south, where it forms the forested ridge known as the Pegu Yoma; this line of mountains is breached about the centre by the Irrawaddy River. Then comes the valley of the upper course of the Irrawaddy (as far as Mandalay) and the continuation of the valley southwards now drained by a smaller stream, the Sittang; both these valley regions are important. The whole of the east of the country is occupied by a broad plateau, which is known as the Shan plateau, through which runs the deep cleft occupied by the Salween River. The Shan plateau is continued southwards into broken forested country, towards the Malay peninsula, through a tract known as Tenasserim.

Structurally Burma falls into two parts: the western half with its valley plains and its folded mountains, of comparatively recent geological date, and the eastern half of the country which consists of a great block of ancient rock, including many metamorphic rocks, tracts of limestone and other areas which are most important because of their yield of minerals. In the western half of the country, in the valley of the Chindwin and the Irrawaddy, is a succession of oilfields, so that Burma is the rival of Trinidad as the largest producer of oil in the British Empire, though its total production is only about 0.6 or 0.7 per cent. of the world's total. The two leading fields are Singu and Yenangyaung, both near the River Irrawaddy. The oil is sent from these fields by pipe-line over 300 miles to the refineries near Rangoon. Burmese oil is rich in volatile constituents and is largely refined for its yield of petrol rather than used as crude oil. There is not much possibility of the further discovery of oil in Burma, but the fields that exist are very carefully worked. In the eastern half of the country one finds in the north the famous old Burma ruby mines, but the drop in the value of rubies and the growth in the manufacture of artificial rubies has led almost to the disappearance of the mining of gem stones. Not far away is one of the largest silver-lead mines in the world, that of Bawdwin with its refinery or smelting works at Namtu, operated by the Burma Corporation. The minerals produced here are sent by rail to Rangoon. Other mineral deposits are known to occur in the Shan Plateau, but many of them are too inaccessible to be worked at present. In the south of the country, however, in Tenasserim particularly,





Similarly the natural vegetation of Burma ranges from the dense equatorial type of forest in the wettest regions, a type of forest which is little exploited because of the variety of trees, but which to a considerable extent has been destroyed by the shifting cultivation of the natives, through the very important

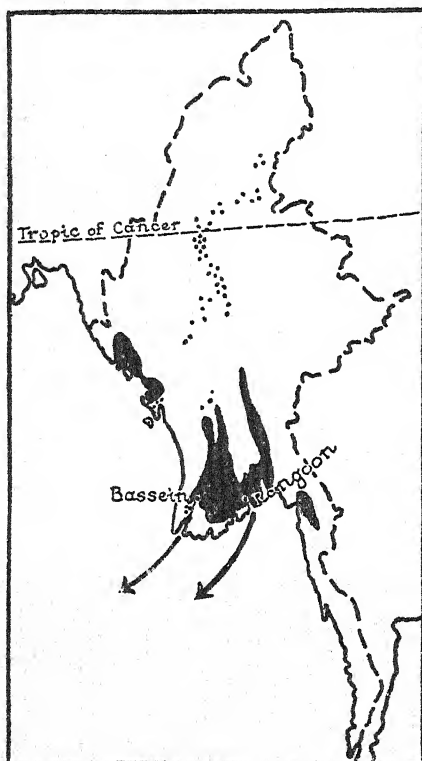


FIG. 135.—The rice lands and ports of Burma.

teak forests where the rainfall is between 40 and 80 inches a year. In normal times timber, particularly teak, forms the second most important export of the country. It must not be supposed that these forests consist entirely of teak trees: teak does not as a rule constitute more than 15 per cent. of the total. The forests, which belong to the group of the monsoon forests, lose their leaves as a protection against the great heat of the hot season. The drier parts of the country have too little rainfall for the adequate growth of forest and are covered with almost useless scrub. A yellow dye, known as "cutch," is made from the acacia trees of part of this belt.

In all the wetter parts of the country rice is the great crop, particularly in the Irrawaddy delta and the smaller delta and valley of the Sittang, together with the limited tracts of flat land along the coasts of Arakan and Tenasserim. Burma rice is not of the highest quality and is used in the European market more for industrial purposes than for human food. Burma is, however, with Siam

and French Indo-China one of the great rice-exporting countries of the world, and rice constitutes easily the largest export. The grain is taken by "paddy" boats through the creeks or canals of the delta to Rangoon or to Bassein, where in the rice mills the husks are removed and the rice exported.

In the Dry Belt of Burma there is a certain amount of irrigation, but much opportunity exists for more. The Dry Zone crops are the usual millet and sesamum, together with limited quantities of cotton and the very important crop, ground-nuts.

The population of Burma includes about a million people belonging to backward hill tribes who constitute the sparse population of the Shan plateau and the hills, and are also found in isolated groups elsewhere.

They are interesting but economically unimportant, and in general they are organised into native states under the rule of their own chiefs. Then about another million of the population consists of immigrants. In the first place there are the Chinese who come to the country mainly to form a sort of middle class consisting of artisans office clerks, shopkeepers and so on. The Chinese are penetrating up-country to the villages and are

intermarrying with the Burmese. There are in Burma practically no Chinese coolies. Coolie labour is performed by the immigrant Indians, who are to be found in large numbers working on the docks in Rangoon and up-country on the railways or near main lines of communication. They have a lower standard of living than the native Burmans, and tend to complicate the life of the country by thus "undercutting" the natives. The remaining 13 million people belong to the Burmese race. The Burmans are Mongols allied to the Chinese or the Malays, and by religion they are Buddhist. Sporting, gentlemanly, with a natural sense of humour, the Burmese are delightful people possessed of good brain power but frequently lacking the concentration or devotion to hard work which is necessary in this modern, sordid world

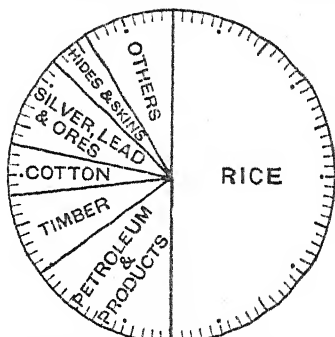


FIG. 136.—The exports of Burma.

and hence liable to suffer from the competition of the Indian on the one hand or the Chinese on the other.

The country has a metre-gauge railway system which connects Rangoon, the capital and chief port, with Prome, the port on the Irrawaddy to the west and with Mandalay *via* the Sittang valley. Mandalay is about the same distance from Rangoon as Edinburgh is from London. A fine new rail and road bridge has now been built across the Irrawaddy at Mandalay and the railway runs considerably farther north and has branches up into the hills. The main highway of Burma is still, however, the river Irrawaddy, which is navigable for a thousand miles from its mouth. Its chief tributary, the Chindwin, is also used. Regular services of the Irrawaddy Flotilla Company run up and down the river and carry much traffic. There is much river traffic, too, in the delta as well as on other rivers in Burma. A great proportion of the timber for the saw-mills of Rangoon is brought down by raft.

Notice the position of the old capital of the country (Mandalay) in the heart of the Dry Belt.

## Part 9. MALAYA

The British sphere of influence at the southern end of the Malay peninsula is conveniently called Malaya. Politically it consists of three parts :

- (a) The Crown Colony of the *Straits Settlements*, including particularly Singapore, Penang and Malacca.
- (b) The *Federated Malay States*, a federation under British protection on the mainland.
- (c) The *Unfederated Malay States*, independent, ruled by their own rajahs, but also under British protection.

Physically and structurally Malaya is a continuation of Tenasserim and eastern Burma or of Siam, and consists of a succession of mountain ranges separated by river valleys having a general north-south direction. Many of the mountain ranges consist of mineralised granite masses, and hence the important production of tin, for which Malaya is famous and of which it produces nearly one-third of the world total.

The amount of flat land suitable for cultivation is limited, and hence Malaya has difficulty in growing enough rice for her

people (*cf.* Ceylon). Climatically the whole of Malaya is near the equator and hence enjoys an equatorial climate with constant heat and moisture, with the average temperature varying but little from 80° F. throughout the year and a rainfall, on the whole, averaging about 80 inches. Where the equatorial forest, which is the natural vegetation of the country, has been cleared, particularly on the western side of the peninsula which

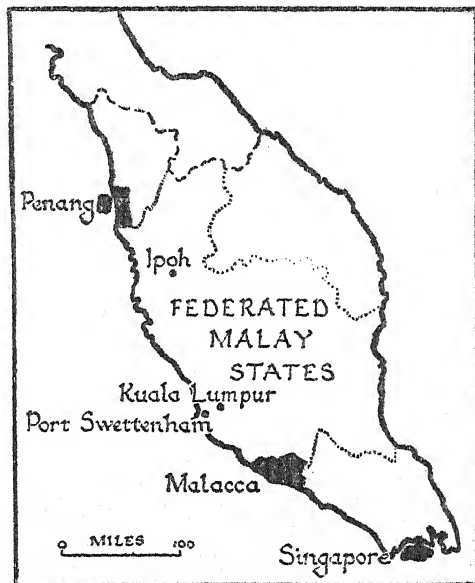


FIG. 137.—Political map of Malaya.

The unmarked parts, south of the main boundary, are the Unfederated States.

is sheltered from the strong monsoon winds by the island of Sumatra, rubber planting is an enormously important industry, and here again Malaya produces approximately a third of the world's total.

The natives of Malaya are the Malays, who are allied to the Burmans in that they are Mongols and share with them their love of a life of ease. As a result the Malays have rather tended to disappear to their jungle villages, whilst the towns have passed into the possession of the energetic, immigrant Chinese,

who now constitute well over a third of the population of the whole country ; in fact, most of the towns may be described as essentially Chinese. On the rubber plantations the labour is supplied by immigrant Indians, so the Indian population of the country fluctuates with the prosperity of the rubber industry.

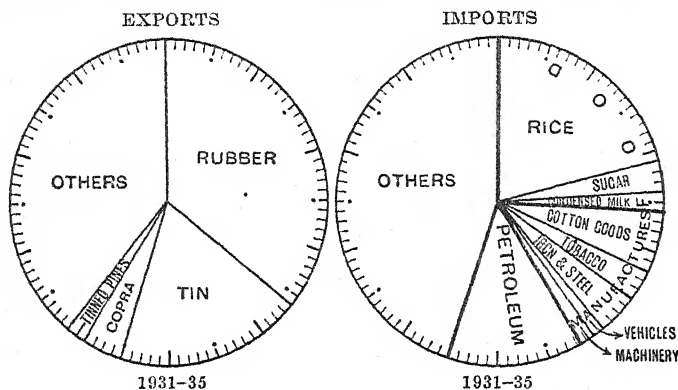


FIG. 138.—The exports and imports of Malaya.

On the mainland the chief towns include Kuala Lumpur and Ipoh, the latter a mining centre, and the port on the mainland which serves Kuala Lumpur is called Port Swettenham. The larger part of the trade, however, passes through the two islands

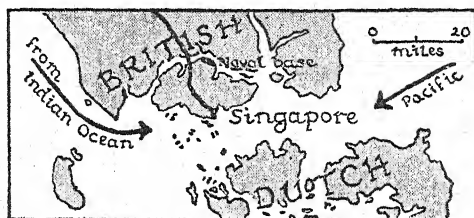


FIG. 139.—The island of Singapore.

of Penang and Singapore, which are great entrepôt ports. The enormous importance of Singapore is closely connected with its world position. A study of the map will show that it guards the routes between the Indian and Pacific Oceans and so between Europe and the Far East ; only since the advent of the aeroplane

has it been possible to travel from Europe to the Far East avoiding Singapore. It is therefore a great ocean junction, the British-controlled entry to the Pacific. Although an island, Singapore is separated from the mainland only by a narrow strait across which a causeway has been built, the causeway being followed by a road and a railway. On one side of the causeway is the important new naval base and oil station. There are two rail connections from Singapore along both sides of the peninsula, connecting with the railways of Siam and so with Bangkok, the capital of Siam.

### Part 10. THE BRITISH SPHERE OF INFLUENCE IN THE EAST INDIES

The greater part of the East Indies, which will be considered in Chapter XVIII, forms the larger part of the Dutch colonial

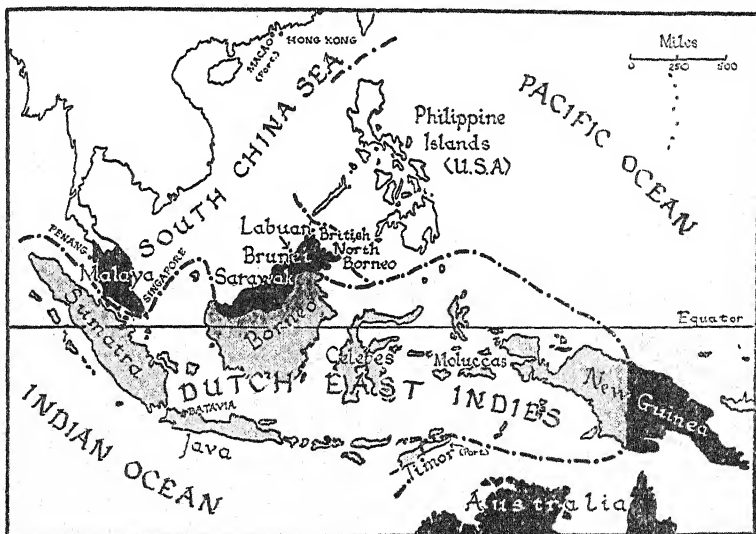


FIG. 140.—Political map of the East Indies.  
British Empire in black.

empire. Britain's interests are in the large island of Borneo; the small island of Labuan off the coast of North Borneo is one

of the Straits Settlements. On the mainland of Borneo the British sphere of influence is divided into British North Borneo, Brunei and Sarawak. The whole island is an equatorial island in general covered with a thick forest, sparsely inhabited by jungle tribes. There is in general a narrow coastal strip where cultivation of rice and other equatorial crops is possible and where the population consists to a considerable extent of Chinese and other immigrants. The importance of the whole area has recently been greatly increased by the discovery of oil and the exploitation of the fields. The territory of Sarawak is remarkable in the fact that it is governed by an hereditary white rajah.

## Part 11. AUSTRALIA

**General Considerations.**—The island continent of Australia is almost coincident with the Commonwealth of Australia, one

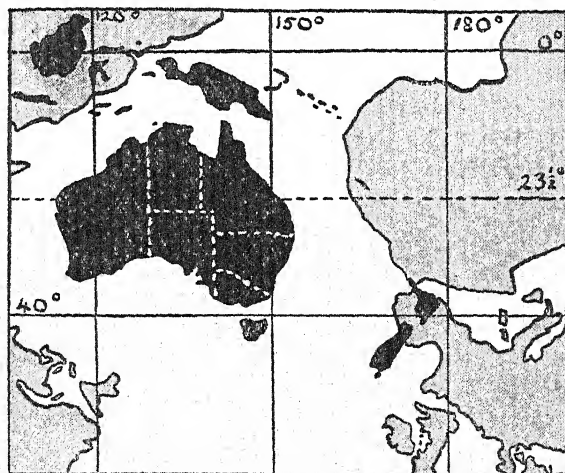


FIG. 141.—The Antipodes of Australia.

of the great Dominions of the British Empire. It is remarkable in a number of ways. In the first place with an area of over 3 million square miles the population is only a little over 6 million, giving an average density over the whole continent

of only 2 to the square mile. In the second place, as a result of the so-called "White Australia Policy," immigration of coloured races is forbidden, so that the population is almost entirely of European, primarily of British, origin. There are several outstanding points about the position of Australia that should be noted. In the first place it is, of course, entirely in the Southern Hemisphere. In the second place the Tropic of Capricorn passes through the continent in such a way that the northern third of Australia is tropical—within the tropics—whereas the southern two-thirds is actually outside the tropics and can be described therefore as a temperate country in that it lies within temperate latitudes. If, however, we compare the position of Australia on the globe with the position of countries in the Northern Hemisphere, we find that Australia is opposite the north of Africa with the great Sahara Desert, and that the southernmost part of Australia, the island of Tasmania, corresponds in position approximately with the north of Spain. The central meridian in Australia is  $135^{\circ}$  E., so that Australia is nearly half-way round the world from the British Isles. It has therefore the disadvantages attaching to comparative inaccessibility from the densely populated parts of Europe and North America.

**Physical Features.**—In its physical features Australia falls quite naturally into three distinct divisions :

(a) The *Western Plateau* occupying half the continent, which consists of a great mass of ancient metamorphic rocks, forming a block standing on an average 1,000 to 3,000 feet above sea-level. Sometimes the plateau reaches directly to the sea in the form of cliffs ; in other areas there is a narrow but important coastal plain, such, for example, as that in the neighbourhood of Perth in Western Australia.

(b) The *Central Lowlands*, drained in the south by the one great river of Australia, the Murray and its tributary the Darling. The Central Plains in the south are interrupted by a north-south line of hills, the South Australia Highlands.

(c) The *Eastern Highlands*, consisting of block mountains and fold mountains, presenting their highest edge to the sea on the east, that is to the Pacific Ocean, and thus leaving only a very narrow coastal plain suitable for settlement. In the northern part, in Queensland, ridges of mountains actually



come right to the coast and settlement is restricted to the small valleys and bays between the headlands. Southwards the Eastern Highlands curve to take on an east and west direction in Victoria, with parallel ranges to the south, whilst the mountainous island of Tasmania can be regarded as a detached mass of the Eastern Highlands.

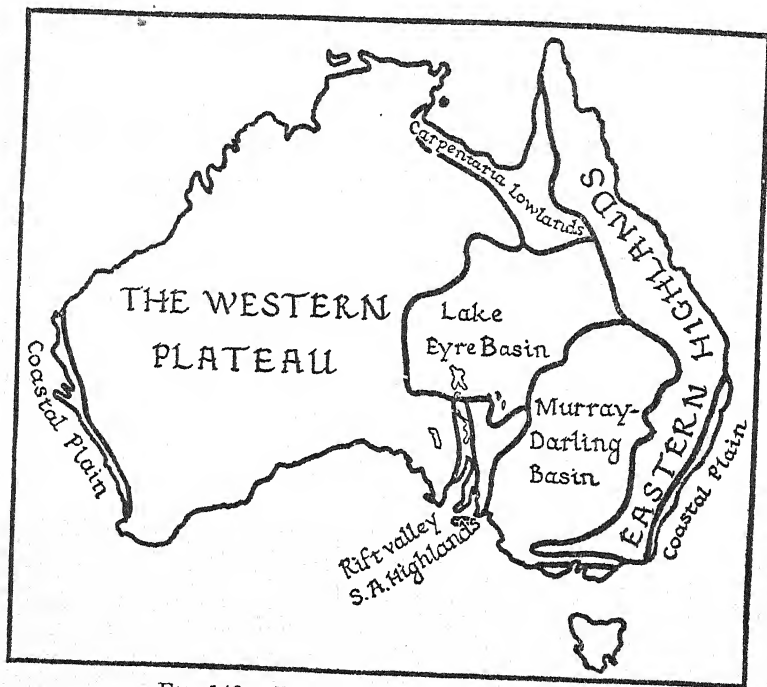


FIG. 142.—Physical diagram of Australia.

**Structure and Minerals.**—Structurally there is a very close correlation with the physical features. The Western Plateau with its ancient rocks is mineralised in areas and gold is of widespread occurrence, but the one important goldfield is that of Kalgoorlie, which led to a gold rush in the '80s of last century and to the extensive settlement of Western Australia. On the eastern margin of the old block at Iron Knob in South Australia is one of Australia's leading iron ore deposits. The Central

Lowlands are in general associated with younger, sedimentary rocks, unimportant from the point of view of minerals but yielding soils excellent for cultivation. Unfortunately much of this area is climatically dry, but the rocks underground have been folded in such a way as to form shallow basins holding up water. These are the famous artesian basins of Australia pierced by a multitude of bores providing water for cattle and sheep ;

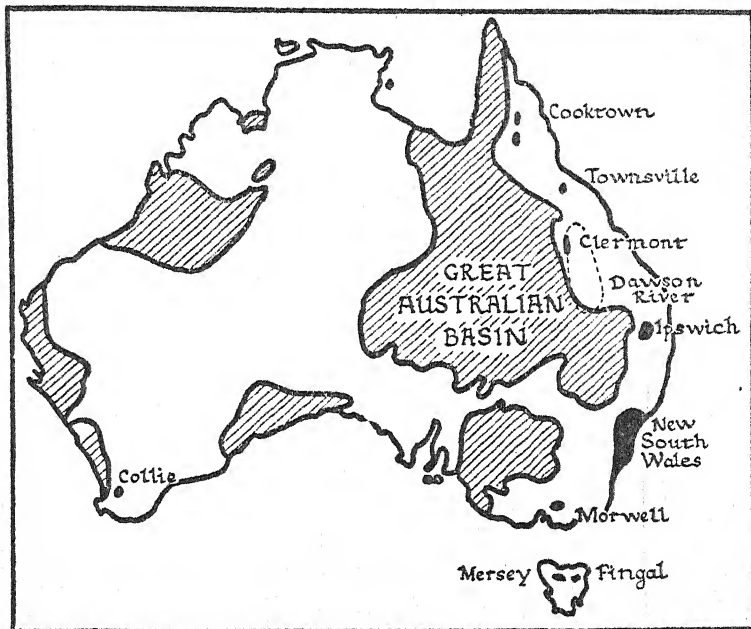


FIG. 143.—The coalfields (in solid black) and artesian basins of Australia.

water which is too saline to be distributed on the ground for purposes of irrigation. The Eastern Highlands are associated in many areas with metallic minerals, with copper in the north, in Queensland, gold in various areas, though not nearly so important as formerly, with limited amounts of tin as well as lead and silver in New South Wales and Tasmania. On the flanks of the Eastern Highlands, forming a semicircle around Sydney, is Australia's largest coal basin and the largest coalfield

in the Southern Hemisphere. It is not as yet fully worked, the main workings being along the northern rim near Newcastle ; on the inland rim, and on the southern rim south of Sydney itself. Extensive search has been made for oil in Australia without success, and the age of the rocks makes it doubtful whether any oil will be found.

**Climate.**—Nature has treated Australia unkindly in the matter of climate. It has been said, with a certain amount of truth, that if one could pick up Australia and fling it down in any other position in the Pacific Ocean it would have a better climate than it enjoys at present. The northern third, tropical Australia, suffers the disadvantages of temperature common to any tropical country. But it is in the matter of rainfall that the continent is particularly unfortunate. The north-western shores receive a tolerable monsoon rainfall, comparable in character with the rainfall of India. Indeed it may be said that tropical Australia has conditions comparable with Peninsular India. The remainder of the continent lies for the most part in the Trade Wind belt, the Trade Winds blowing from the south-east, that is, they impinge against the eastern shores of Australia just where the Eastern Highlands present their mountainous front to the ocean ; in other words, it is only the very narrow coastal strip along the east which receives a good rainfall. Inland the rainfall rapidly diminishes and soon aridity is the great problem. Over one-third, at least, of the interior we must describe the conditions as those of a desert and habitation is virtually impossible. The southern margins of Australia, notably the south-western corner of Western Australia, the south of South Australia and part of Victoria are situated in latitudes corresponding with the Mediterranean latitudes of Europe. These parts of the continent have a Mediterranean climate, with moderate rain in the winter months and drought in the summer and consequently have the same products as typical Mediterranean lands. The island of Tasmania, on the other hand, lies in the westerly wind belt corresponding generally with the westerly wind belt of northern Europe, and receives a good rainfall. Unfortunately much of the island is mountainous and the amount of land which can be used is limited. These all-important facts of climate, relative to Australia, can best be studied by reference to the map. The general position is a

well-watered fringe and a vast, inadequately watered interior where, in addition, the already inadequate rainfall is very variable from year to year.

**Natural Vegetation.**—The natural vegetation of Australia does not show as much variation as the climate would lead one to expect. The continent was isolated at an early stage from

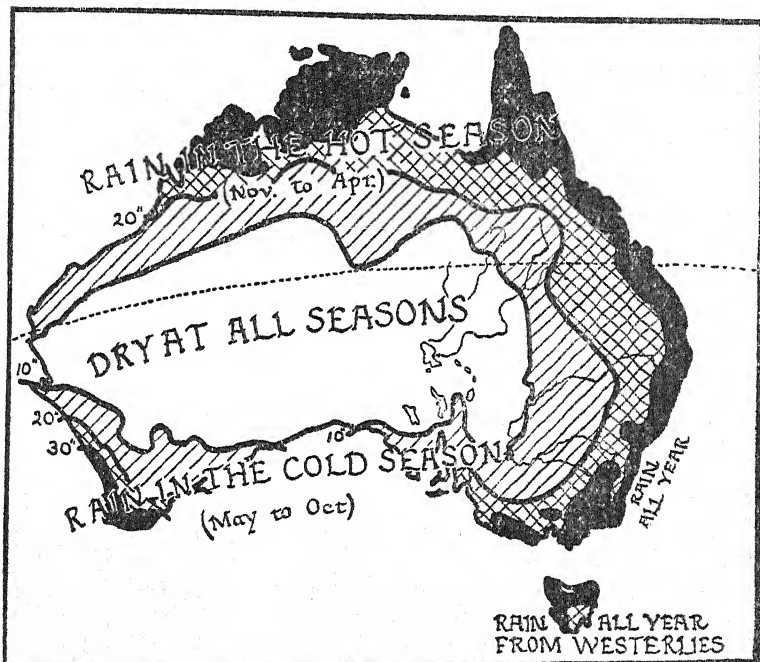


FIG. 144.—Rainfall map of Australia.

the rest of the world, and so it has a peculiar flora as well as a peculiar fauna of its own. Amongst the trees particularly characteristic the eucalyptus is well known, and there is not so much difference as one would expect between the eucalyptus forests of the Mediterranean lands of the south-west and the eucalyptus forests of tropical Queensland. In general there is, or was, a forest fringe in the wetter parts passing inland to grassland with scattered trees (savana or "downland"), then

in the interior to scrubland and so to desert. This again is best understood by reference to the map.

**Agriculture.**—The wealth and prosperity of Australia still depend to a major degree on primary production. The leading export is wool and the sheep of the country, exceeding a hundred million in number, are to be found :

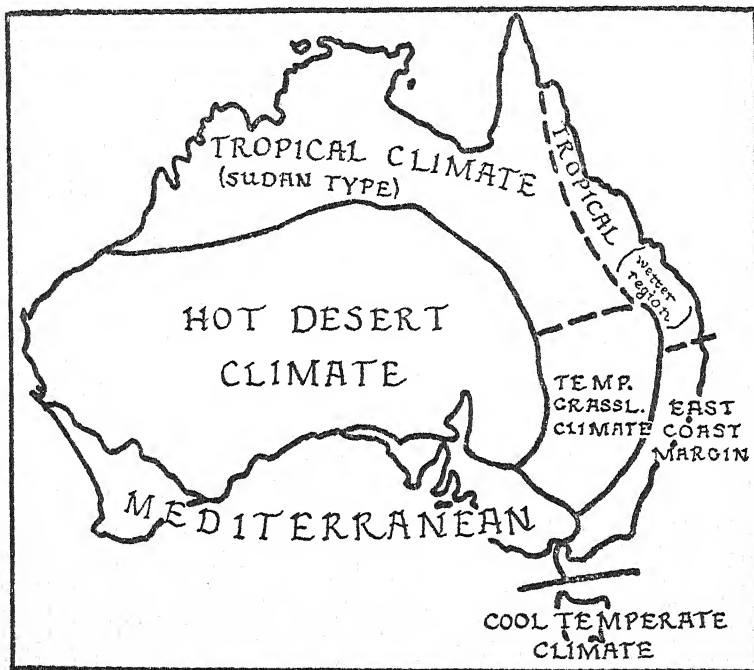


FIG. 145.—The climatic regions of Australia.

- (a) In the temperate part of the continent.
- (b) Where the rainfall is between 10 and 30 inches a year in particular.

Thus there is a broad sheep-rearing belt running through New South Wales, northern Victoria, South Australia and occupying a limited area in Western Australia. The wetter parts of the same belt are those which are most suited to the cultivation of wheat, of which the country is a large producer. A limited

number of beef cattle are kept on the tropical grasslands of the north, but no attempts for the closer development of this land have achieved outstanding success. Much more important are the cattle lands of the south, including the dairy-farming strip of the well-watered coastlands south and north of Sydney and of the valleys of Victoria. There is an important development

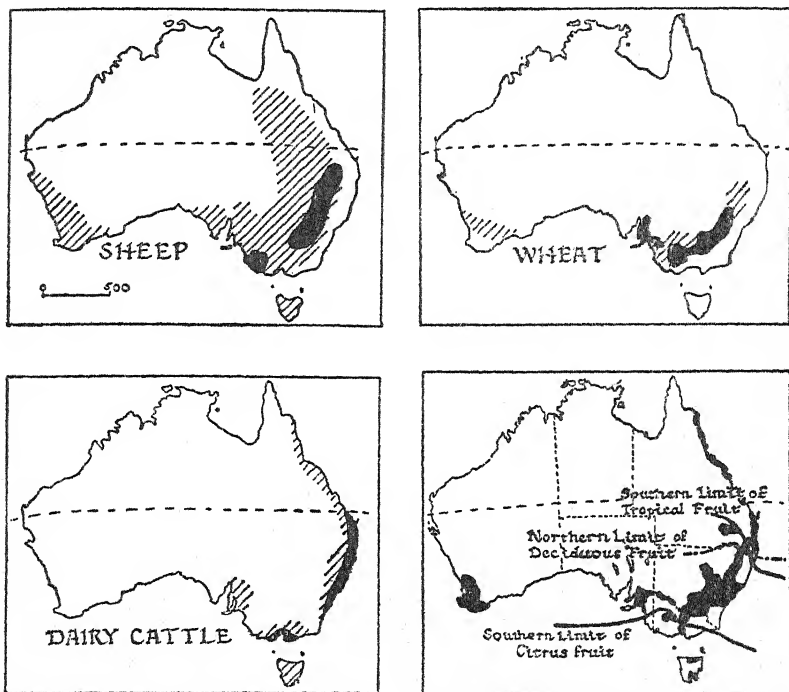


FIG. 146.—Australian crops and animals.

It should be noted that nearly all are to be found south of the Tropic of Capricorn, i.e. in temperate Australia.

of fruit farming; tropical fruit (including pineapple and banana) in Queensland, where also one finds the cultivation of sugarcane as an important industry, but of greater value to the country are the Mediterranean fruit-growing lands of Victoria, South Australia and Western Australia. The vine takes an important place for the production of wine, particularly in

South Australia, and the cultivation of oranges, as well as peaches and apricots for drying and tinning, is noteworthy. In the more temperate south, Victoria and Tasmania, there is a considerable growth of apples together with an export of this fruit.

**Population.**—Although it has just been said that the prosperity of Australia depends to a large extent on the development of its primary production, it is remarkable that over half of the existing small population of just over 6 million is to be found

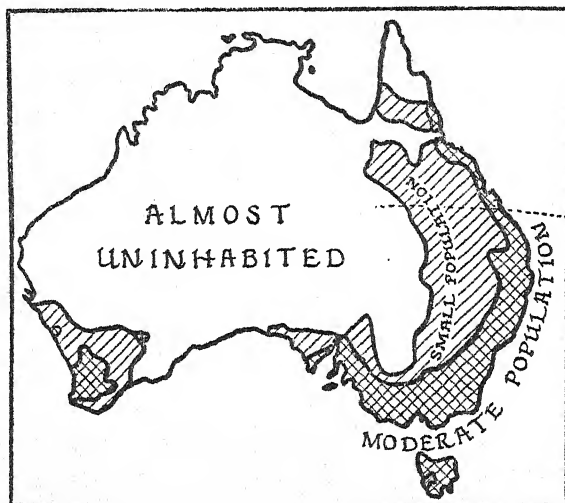


FIG. 147.—The population of Australia.

in the capital cities. Both Sydney and Melbourne are cities of over a million inhabitants, Perth, Adelaide and Brisbane between them house nearly another million. Whilst the leading imports of the country are manufactured goods, there has been a marked tendency in recent years to develop manufactures in these cities to satisfy local needs. It will be noticed that almost without exception the leading cities of Australia are coastal or are to be found in the fringe of well-watered country. Sydney is not only the chief town of New South Wales but is also the leading port of the country, its close rival being Melbourne, occupying a similar position with regard to Victoria, whilst

Adelaide, the chief town of South Australia, is separated by a few miles from its deep-water port. Perth similarly is a few miles from Fremantle, its deep-water port, whilst Brisbane itself is a port. Notice the position of the other chief towns along the coast of Australia.

During the last century and a half Australia has been settled by white immigrants coming particularly from England, but

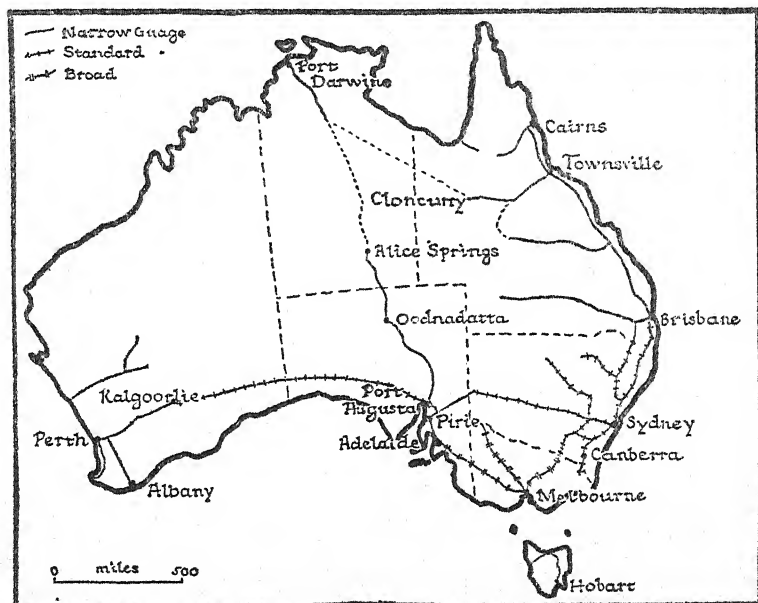


FIG. 148.—The towns and railways of Australia.

distance has been her enemy just as it has in the United States. The growth of the railway system, for example, took place from a number of centres, with the result that there was not at an early date a correlation of ideas; now that the railway systems are joined up they are found to be on different gauges and through communication is impossible. Queensland, Western Australia and part of South Australia have the narrow gauge, 3 feet 6 inches, Victoria has a broad gauge of 5 feet 3 inches, whilst New South Wales and the trans-continental line run



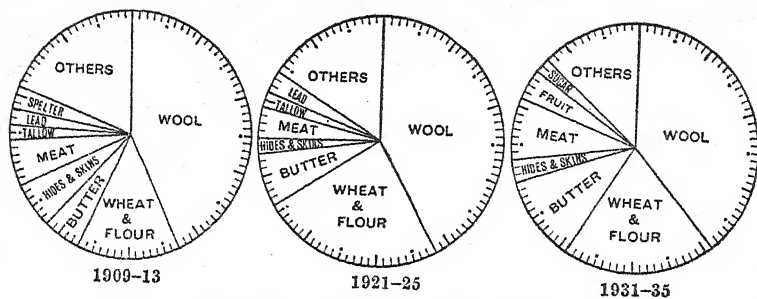


FIG. 149.—The exports of Australia.

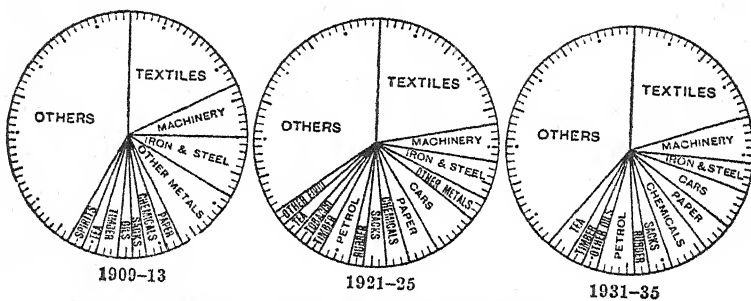


FIG. 150.—The imports of Australia.

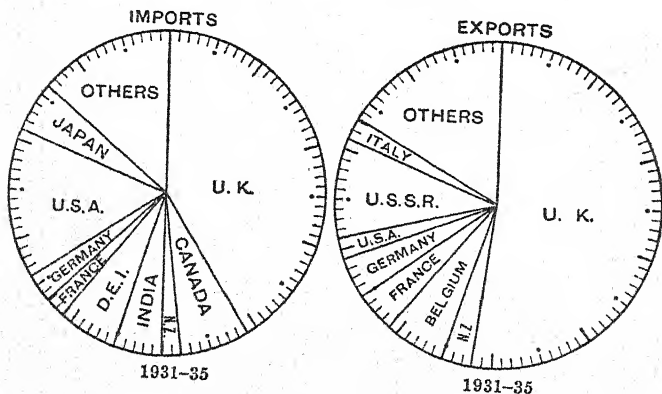


FIG. 151.—The direction of Australia's trade.

and owned by the Commonwealth are on standard gauge (4 feet 8½ inches). In the dry season it is often possible to travel across country on the dry tracks by car, but there is now an important move towards the development of extensive highways. The coming of the aeroplane has made a great difference to Australia, in that it throws into ready touch with the great centres the outlying farmer who can now be visited by the doctor with his plane. Wireless has largely killed the isolation which was the curse of the pioneer.

In its foreign trade relations its close connection with the Mother Country should be noted, in that more than half the total trade is with Great Britain. The United States and Japan also share largely and large quantities of exports go to France, Italy, Belgium and Germany. The Panama Canal has made a great difference to Australia and half the trade from Australia and New Zealand now passes to Europe through the Panama Canal and not through the Suez.

## Part 12. THE DOMINION OF NEW ZEALAND

The two large islands which together make up New Zealand have an area rather less than that of the British Isles, but in many ways there is a close connection between the "brighter Britain" of the south and the presumably duller Britain of the north. Both groups of islands lie in the westerly wind belt, and both have their most mountainous side on the west, with the result that they have hills and mountains enjoying a heavy rainfall on the west and drier plain lands on the east. New Zealand is nearer the equator than the British Isles and on the whole enjoys a more equable and rather warmer climate. As in Britain, no part of New Zealand suffers from drought, a contrast to Australia. In the South Island are the Southern Alps, the main mountain chain, on the west; there are some peaks of these mountains rising to 10,000 feet, and in the south-western corner the mountains reach the sea in such a way as to give rise to very attractive fiord country. There are some narrow areas with small settlements between the Southern Alps and the sea, and around Westport and Greymouth there are the small coalfields of New Zealand. The towns are connected with the plains on the eastern side, notably with the Canterbury plains,

by a railway passing through the longest railway tunnel in the British Empire. The Canterbury plains are sheltered and enjoy a rainfall of less than 40 inches and are occupied by downland

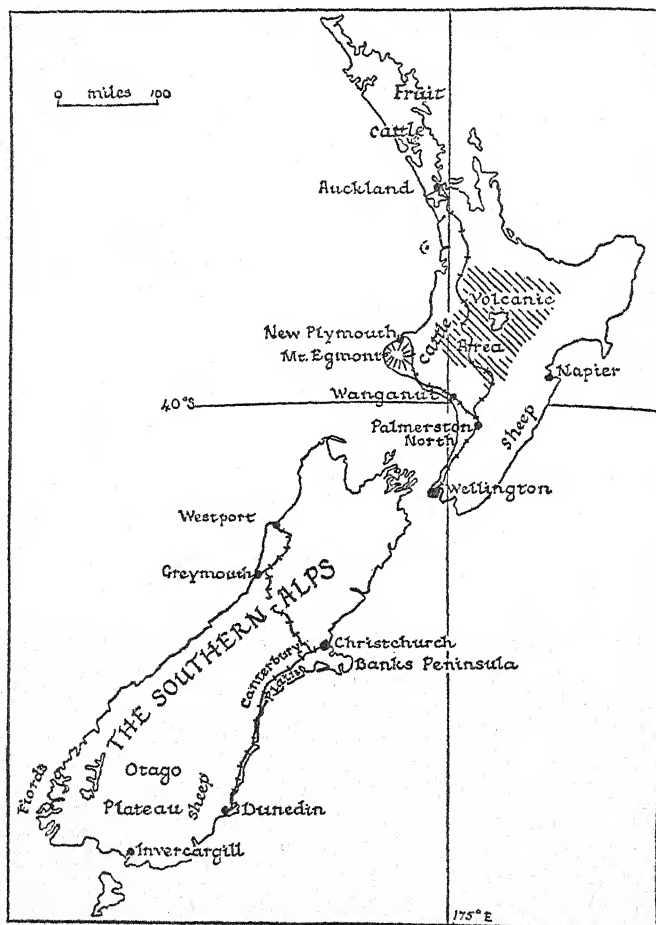


FIG. 152.—New Zealand.

important for sheep, with a limited amount only of cultivation and with cattle on the slighter damper Banks peninsula. Sheep are also important on the rather less fertile Otago plateau

farther south. Mineral regions in New Zealand (including this southern region) have yielded much gold in the past; there has been a recent resuscitation of gold mining largely owing to the rise in the price of gold compared with sterling.

The topography of the North Island is more varied. There is a central core, not very fertile, of volcanic mountains and a number of extinct volcanoes exist elsewhere, including the beautiful Mount Egmont in the west. In the northern island there is a larger stretch of well-watered rolling country giving rise to cattle pastures on the west. Hence the great production of butter, cheese and other dairy produce is largely from the northern island, focussing round Auckland, the largest town in New Zealand, in the north and around such centres as New

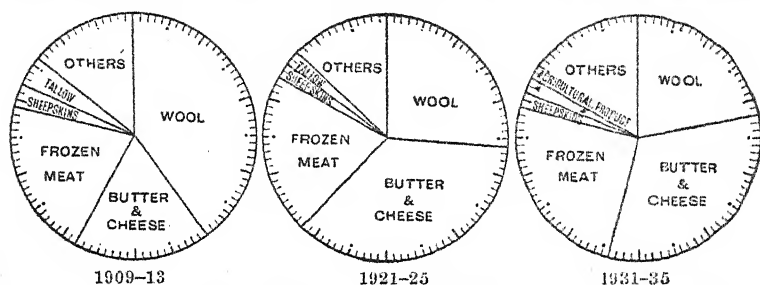


FIG. 153.—Exports of New Zealand.

Plymouth, Wanganui, Palmerston North and the capital Wellington. On the eastern drier side of North Island sheep farming is more important.

The prosperity of the million and a half people of New Zealand thus depends very largely on the success of their primary products, particularly on their sheep for wool, lamb and mutton, and on their cattle for their butter and cheese; these constitute between 80 and 90 per cent. of the exports of the country. The connection with Great Britain is very close indeed, for more than 80 per cent. of the exports go to the Mother Country and more than 50 per cent. of the imports come from there. The purchases are naturally manufactured goods, iron and steel and machinery, and clothes and cotton goods. New Zealand has achieved a prosperity and foreign trade which, rated by *per capita* value, is more than that of

any other country in the world in spite of one great disadvantage—distance from the populous centres of Europe.

### Part 13. BRITAIN IN THE PACIFIC OCEAN

The Pacific is a very different ocean from either the Atlantic or the Indian. True, the Atlantic Ocean separates continental masses on either side in the same way as the Pacific, but the point about the Pacific is its enormous width. If one follows along the equator from the Panama Canal to Singapore, right across the Pacific Ocean, the distance is almost as far as if one went right across the Atlantic Ocean and Africa and reached Singapore that way ; in other words, the Pacific Ocean stretches nearly half-way round the globe. Thus trans-Pacific routes are very different from trans-Atlantic routes. What is Britain's interest in the Pacific ? In the first place New Zealand lies in the Pacific and the eastern shores of Australia are washed by the Pacific, whilst guarding the entrance into the Pacific Ocean from Europe is Singapore, just beyond is the British sphere of influence in Borneo. To the north, on the western side of the Pacific, are China and Japan ; on the far side of the Pacific lies the British Columbian coast of Canada. Thus the British Empire has vital interests both on the western side and the north-eastern side of the Pacific Ocean. Since the days when Captain Cook carried out his great voyages of exploration, Britain has had possessions amongst the innumerable islands of the Pacific Ocean. The chief group in the heart of the Pacific is the Fiji Islands, but there are many smaller islands which are used as cable stations or more recently as wireless stations, including Norfolk Island. To be included among Britain's interests in the Pacific there is the island of Hongkong and the neighbouring leased territory in the south of China. As a free port, under a good government, the tiny island has attracted almost a million Chinese settlers who include rich merchants benefiting from the stable government ; and a large proportion of the foreign trade of China has in the past gone through Hongkong. It depends upon the development of stable government in south China how much of this entrepôt trade will remain to Hongkong. Already the leased territory of Wei-hai-wei, farther north on the coast of China, has been given up.

Britain has now new interests to protect in that New Zealand has nominal control of a section of the Antarctic continent lying to the south of the Pacific and where there is a certain importance in the whaling industry.

#### Part. 14. THE BRITISH EMPIRE IN TROPICAL AFRICA

**West Africa.**—The British spheres in tropical Africa may be considered in two portions : West Africa and East Africa. In West Africa along the shores of the Gulf of Guinea lie the four British possessions of *Gambia*, *Sierra Leone*, the *Gold Coast* and *Nigeria*. In general there is a narrow coastal strip which is succeeded inland by a ridge of hills, then the land slopes away again towards the interior before rising to the plateau region properly speaking. The hills and the plateau usually consist of ancient metamorphic rocks, highly mineralised in places and so significant for the production of minerals. Amongst minerals may be noted particularly the tin of the plateau in Nigeria and the gold and diamonds of the Gold Coast. The recently exploited coalfield farther south, in Nigeria, is one of the few coalfields in tropical Africa.

Climatically the whole of West Africa lies north of the equator, but the great heat of the interior gives rise to in-blowing winds in the summer months and hence to a monsoon, which is actually the South-East Trade Wind of the Southern Hemisphere which passes across the equator and reaches West Africa as a south-south-west or sometimes as a westerly wind. Where this wind in the summer months or the rainy season blows at right angles to the dominant direction of the coast, a very heavy rainfall results ; where, however, the winds blow, as they do from Takoradi to Lagos, parallel to the coast, the rainfall is but small. Since there are hills quite close to the coast the rainfall decreases rapidly as one goes inland in the same way as the range of temperature increases inland. Thus there are, on the whole, belts of country parallel to the coast very different in general characteristics. Near the coast, except in the drier parts, is a belt where the natural vegetation is equatorial forest and from which mahogany and other cabinet woods are obtained. At a few places along the coast where the land has been cleared rice is an important cereal crop, but elsewhere it is the cultivated

oil-palm which is the leading crop. Just behind the main coastal belt is the region where the cacao tree is grown in quantity; the Gold Coast produces more than half of the world's total, and Nigeria is also a large producer. Farther inland kola nuts are

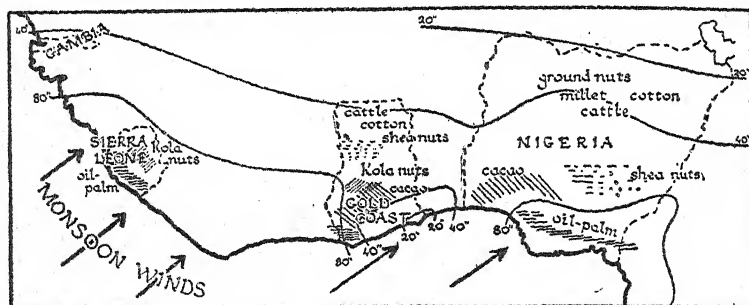


FIG. 154—West Africa—rainfall and products.

grown and in drier parts shea nuts, from which the native shea butter is obtained, whilst on the plateau there are tracts given over to the cultivation of cotton, ground-nuts and other oil-seeds, and where cattle become of considerable importance. The whole

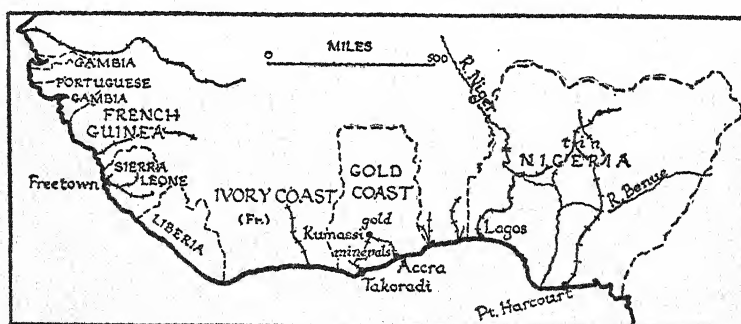


FIG. 155—West Africa—communications.

area is moderately populated by native tribes. Road and rail have been developed and the natural disadvantages of the shelving coast have been recently overcome by the construction of the fine harbour of Takoradi in the Gold Coast, but Lagos and

Port Harcourt are the two principal ports in Nigeria. A careful study of the diagrams, including the communications map, should be made here.

**East Africa.**—It was the dream of Cecil Rhodes that British territory should extend from the Cape of Good Hope to Cairo, a territory which should be welded together by the Cape-to-Cairo railway. British territory does not extend from the Cape to Cairo, but the British sphere of influence definitely does. The Cape-to-Cairo railway has never been completed in its entirety, but by rail and water and by short stretches of road traversable by motors it is easily possible to make the journey, whilst aeroplanes on their way from London to Cape Town follow almost exactly the route which was planned by Rhodes for his Empire railway. From north to south the countries along the route are as follows. *Egypt* is an independent kingdom consisting essentially of the narrow, fertile valley of the Nile, only some 10 miles wide, with its crowded population hemmed in by the steep cliffs on either side; beyond lies the almost limitless desert. In the north-eastern corner is the Suez Canal, opened in 1869–70 and under the control of an international company, mainly a French company, but one in which the British Government is a considerable shareholder. The peace and security of Egypt, including as it does this all-important world link within its territory, is one of considerable importance to the countries of Europe and especially to Britain, who has her numerous overseas territories round the Indian Ocean to consider. There is a strong British influence in Egypt and a strong military force in that country.

South of Egypt, again on either side of the Nile, lies the large territory of the *Anglo-Egyptian Sudan*, a land of plains within the tropics and so tropical in character and watered by or drained by the two great branches, the White Nile and the Blue Nile, which unite below Khartoum to form the main Nile of Egypt. The northern part of the Sudan is semi-desert in character and much of the south-west is a great swamp—the Sudd. The important region is in the neighbourhood of Khartoum, where irrigation works have rendered fertile a vast tract of country important for the growing of cotton. The Anglo-Egyptian Sudan, as its name implies, is under the joint control of Britain and Egypt. The Blue Nile actually rises in



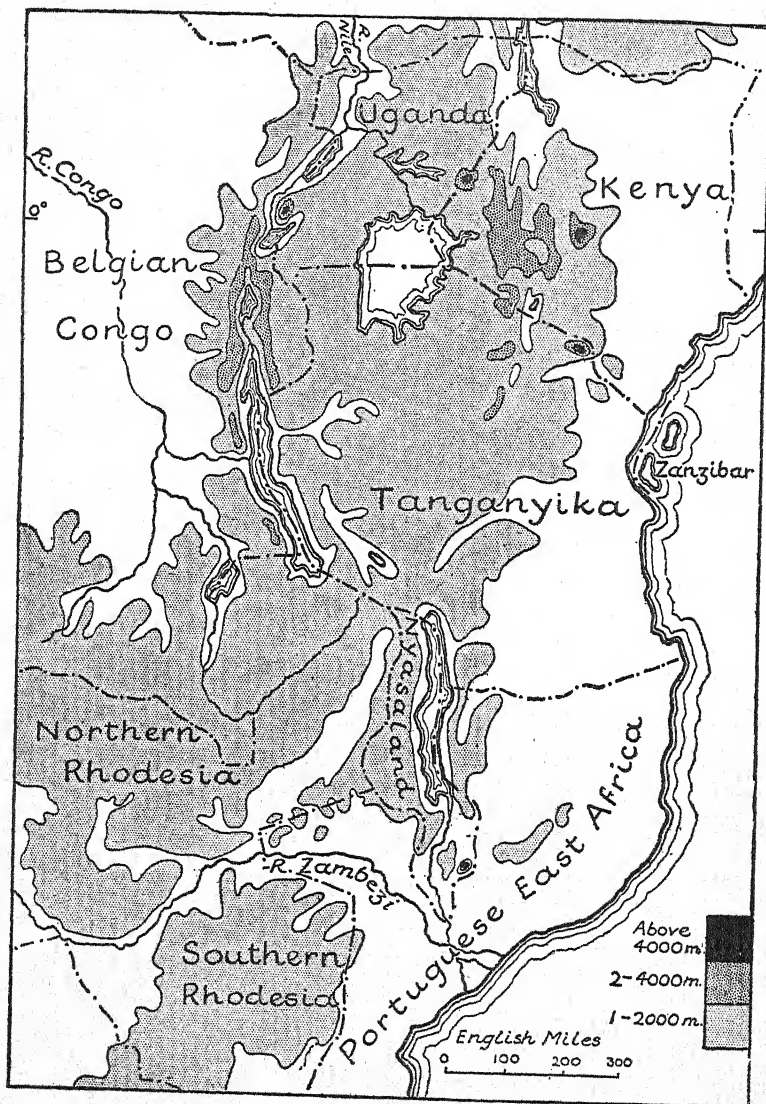


FIG. 156.—Physical map of East Africa.

The shaded area is all over 3,000 feet above sea-level and, although in the Tropics, is mostly suitable for white settlement because of elevation.

Abyssinia, and so relationships on the border with Abyssinia are of considerable significance.

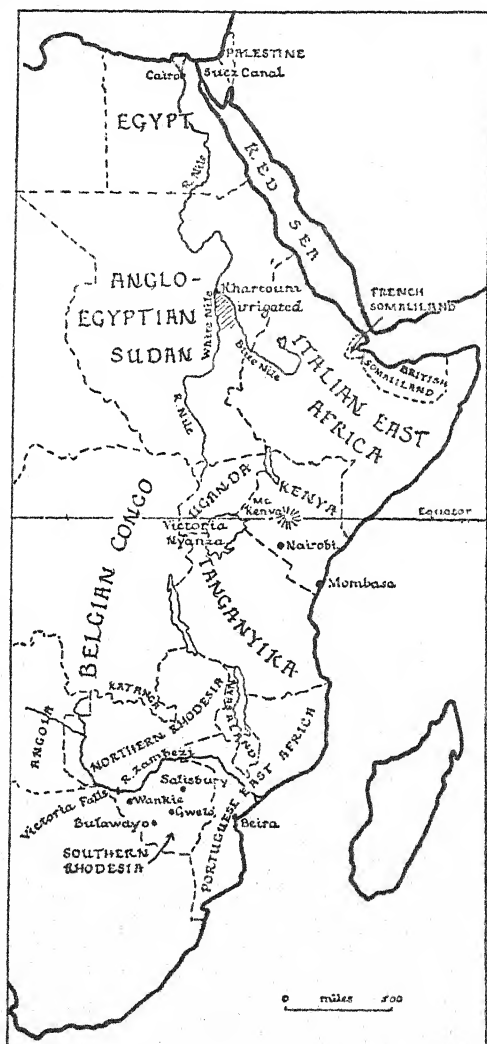


FIG. 157—East Africa—political.

South of the Sudan, actually lying on either side of the equator and with no coast-line, is the colony of *Uganda*, situated particularly north of the great lake of Victoria Nyanza, from which the White Nile takes much of its water. The considerable negro population of Uganda is distributed throughout the country largely on a basis of adequate rainfall. The cultivation of cotton is one of the leading occupations. From Uganda to the coast and again across the equator stretches the colony of *Kenya*. On its western, or inland, side Kenya includes a section of the great Rift Valley of Africa, then a broad section of the East African plateau on the surface of which lies the great volcano of Mount Kenya, whilst on the eastern side of the country there is a low coastal plain. This coastal plain does not receive an adequate rainfall, is largely desert and deserted, but most of the plateau of Kenya is sufficiently high to have a genial climate despite its situation on the equator, and thus there are large tracts suitable for white settlement. In addition then to its considerable native population Kenya is also a white settler's country; the interest of the white settler is in cotton and coffee and various crops for export, whilst the interest of the native is largely in his extensive herds of poor cattle and his crops of maize and millet for his food.

South of Kenya is the large mandated territory of *Tanganyika*, formerly German East Africa, less suitable for white settlers than Kenya. Inland again along the shores of Lake Nyasa is *Nyasaland*. To reach Nyasaland the railway from the south crosses the Zambezi by a wonderful bridge. Inland and forming a connecting link as it were between tropical Central and temperate South Africa are the Rhodesias, *Northern Rhodesia* and *Southern Rhodesia*, whose very names record the work of the pioneer Rhodes. Northern Rhodesia is sparsely inhabited savana country and as yet has but a handful of white people, but is a country of the future because of the important minerals which it shares in the great copper belt of the Katanga with the neighbouring Belgian Congo. Forming the boundary for part of the way between Northern and Southern Rhodesia is the great Zambezi river and the Victoria Falls lie between the two. Just below the falls the great gorge is now spanned by a bridge carrying both road and rail. It was in 1935 that the first move was made in the construction of power

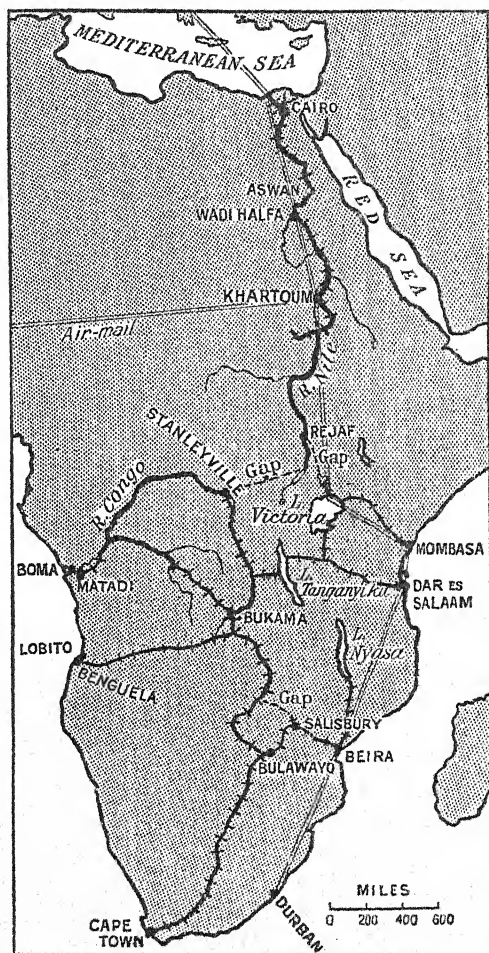


FIG. 158.—Communications of Central Africa.

This map shows railways, navigable waters and chief British airways, and demonstrates the rival ports serving the mineral district of the Katanga (around Bukama), and also shows how much of the Cape-to-Cairo railway now exists.

works at these, perhaps the greatest of all the waterfalls in the world. That part of Southern Rhodesia which lies more than 3,000 feet above sea-level is suitable for white settlement and it is in this part that we find the capital, Salisbury, the dairy-farming centre of Gwelo and the southern centre of Bulawayo. Southern Rhodesia has coal at Wankie and is developing an export of citrus fruits—oranges. Notice carefully the position of Rhodesia on the map and the necessity which it has of using varied outlets ; the new side-door through Angola to the Atlantic, or the southern route to the Union or the route to the east through the Portuguese port of Beira. Southern Rhodesia since 1923 has been a self-governing colony.

## Part 15. THE UNION OF SOUTH AFRICA

**General Considerations.**—In 1910 the Union of South Africa was constituted a Dominion of the British Empire and was formed by the union of the four colonies, now the four provinces of the Union, the Cape of Good Hope, the Orange Free State, Natal and the Transvaal. Included now under the administration of the Union is the large mandated territory of South-West Africa, formerly German South-West Africa. The neighbouring protectorates of Bechuanaland, Swaziland and Basutoland are under Imperial Protection. The area of the Union proper approaches half a million square miles and has nearly 2 million Europeans and  $5\frac{1}{2}$  million natives as its population. South-West Africa, though largely desert, is nearly a third of a million square miles in area, but has only a quarter of a million people, whilst Bechuanaland has similarly over a quarter of a million square miles, but has less than a quarter of a million population. We should notice first that if we take the Union proper it lies almost entirely outside the tropics ; only the northern part of the Transvaal is a tropical country ; the rest is in temperate latitudes, and partly for this reason and partly because of the elevation above sea-level, the country is particularly suitable for white settlement. Thus it is different from the remainder of Africa in its people and its problems as well as in its history and development.

**Physical Features.**—The Union of South Africa comprises a considerable piece of the plateau which makes up the whole

of Africa. Nearly all of it is over 3,000 feet above sea-level; the south-eastern edge is the highest and nearly everywhere is 6,000 feet high and is known actually as the Drakensberg Mountains. To the east is an important coastal strip, well watered and constituting the greater part of Natal. To the south the drop to the coast is by a series of steps, occupied by the Karroos (the Great Karroo and the Little Karroo) separated

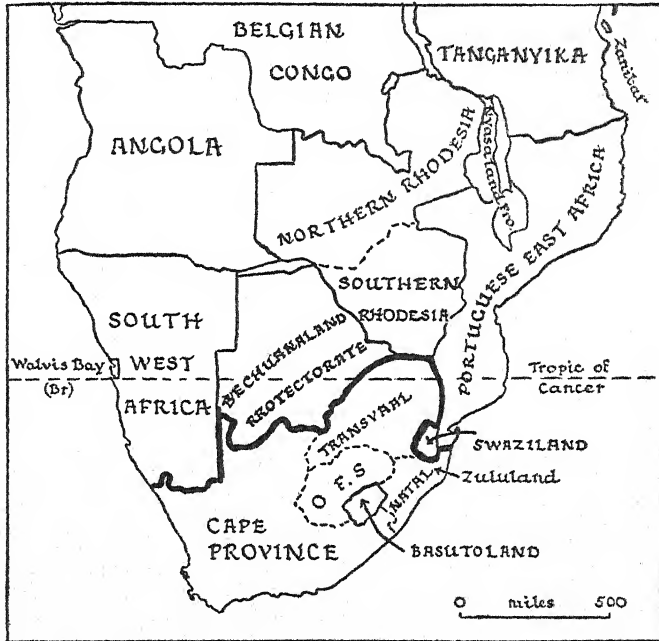


FIG. 159.—Political map of South Africa.

by lines of mountains before the coast is reached. In the south-western corner the arrangement of the mountains between the plateau and the coast is rather more irregular, and here we have the more fertile valleys in the neighbourhood of Cape Town. Between the lower western edge of the plateau and the coast there is a narrow coastal plain which is actually a desert strip.

**Structure and Minerals.**—The plateau consists of ancient metamorphic rocks, but covered over large stretches by volcanic

rocks and by rocks of sedimentary origin. Where the ancient rocks come to the surface they are often highly mineralised, and in the Johannesburg or Witwatersrand district of the Transvaal are the world's greatest goldfields, yielding nearly half of all the gold in the world. In many of the ancient rocks also, both in the north near Pretoria and in the neighbourhood of Kimberley as well as elsewhere, there are the "pipes" which yield the famous diamonds. Of more recent discovery and exploitation are the platinum and copper deposits. It is perhaps true to say that the exploitation of the gold of the Rand has

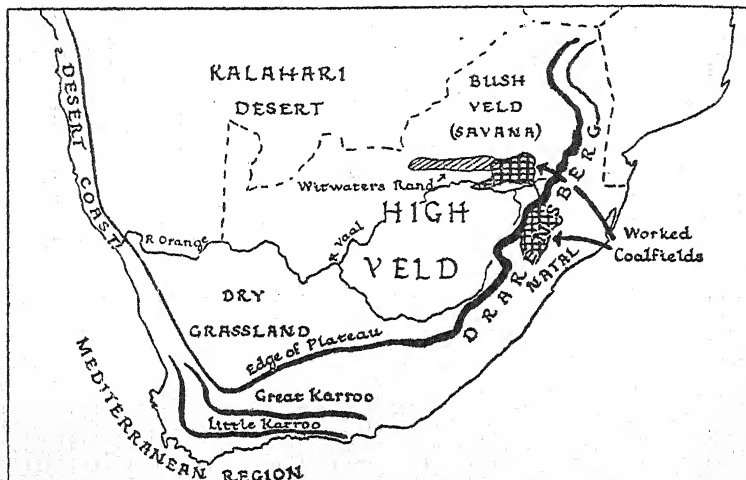


FIG. 160.—The regions of South Africa.

been made possible by the occurrence of large supplies of coal. The coal is worked both in the Transvaal on the surface of the plateau and where the seams crop out on the edge of the plateau in Natal, notably in the neighbourhood of Newcastle, from where the coal can readily be sent on a predominantly downhill journey to the port of Durban.

**Climate.**—The south-western corner of the Union of South Africa, Cape Province, comes under the influence of the westerly winds in the winter and hence enjoys a Mediterranean climate, with the resultant production of Mediterranean fruits. The

remainder of the Union of South Africa lies within the Trade Wind belt, the Trade Winds blowing from the south-east. Thus, as in Australia, they give a well-watered coastal strip marked by rich pastures, dairy-farming and cultivation of sugar and maize in Natal and Zululand. But the winds have dropped the greater part of their moisture before reaching the surface of the plateau. The eastern half of the plateau has, however, a rainfall which is sufficient for the growth of grass and for the great cereal maize, and is able to support a very large number of sheep in the drier parts. As one passes to the western half of the plateau conditions become much drier and one finds that this is a region of desert or semi-desert, the Kalahari Desert. The driest of all parts of South Africa is the coastal strip on the Atlantic coast, and it will be seen that South-West Africa, the former German area, is very unfortunate from the climatic point of view.

**Vegetation and Agriculture.**—The vegetation and agriculture are clearly allied to climate—particularly rainfall conditions. Sub-tropical and tropical forests can flourish on the eastern coastal strip, Mediterranean forests in the wetter regions of the south, where pines and the Australian eucalyptus have been extensively planted. But on the whole the Union of South Africa is very poor in both natural and planted forest and is deficient in timber. The natural vegetation of the plateau is grassland; this is one of the great regions of temperate grassland in the world and here the grassland is known as the High Veld. It is not until one gets to the northern part of the Transvaal that the veld passes into the savana by the appearance of trees amongst the grass.

**Population and Settlement.**—At first the coast of South Africa was merely important as a calling place and watering place for vessels on their voyage round the Cape of Good Hope on their way to India. This route was an important one to the Portuguese and later to the British, but particularly to the Dutch. The early settlement around Cape Town was Dutch, and later the gold attracted white men to what is now the Orange Free State and across the Vaal river (the Transvaal). The British settlement had a particular focus in Natal, starting about 1820, and this is still predominantly British. The clash of



interests came to a head in the Boer War of 1899–1902, since when the two peoples have worked amicably side by side and have welded themselves together into a South African nation. The Union of South Africa is bi-lingual, the two languages being Afrikaans, the South African form of Dutch, and English. On the whole the Afrikaans-speaking people are farmers on the Veld, the population of British origin tends more to be concentrated in the towns.

South Africa was never very densely populated by a native African stock; the most extensive population is in the well-

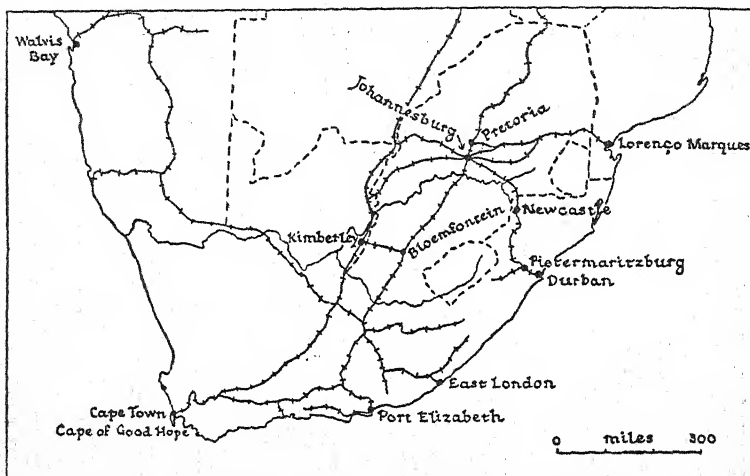


FIG. 161.—The communications and settlements of South Africa.

watered east, in Zululand, and the population is insufficient to supply the labour which is now required. Labour for the mining regions of the Transvaal is imported, largely from Portuguese East Africa.

The railway system of the Union of South Africa, on a narrow gauge, is important and should be carefully noted. The responsibilities of the government of the country are shared between Cape Town for certain purposes and Pretoria for others. Although the nearest large port for Europe, Cape Town, whilst well situated for its immediate hinterland with its Mediterranean fruits, is not well situated for the large interior and its

place has to some extent been taken by Port Elizabeth, more centrally placed and which has recently been given an excellent modern harbour. The third great port is Durban, or Port Natal, chief town also of Natal and of the eastern coast, though the administrative centre of Pietermaritzburg is just inland. Of

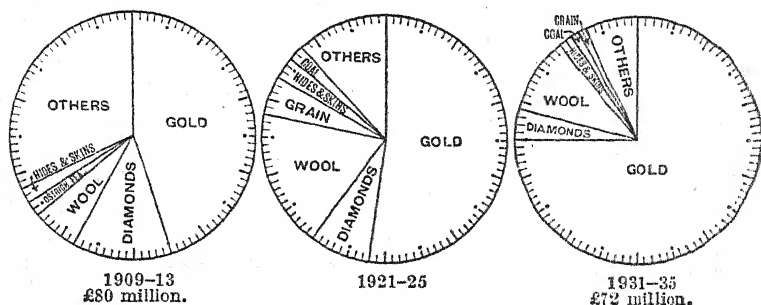


FIG. 162.—The exports of the Union of South Africa.

inland towns there is the great Johannesburg, the centre of the gold-mining area, Pretoria farther north, chief administrative centre of the Transvaal and in part of the Union. In the northern Transvaal the recent development of fruit cultivation is significant and it should be noted that the nearest outlet for

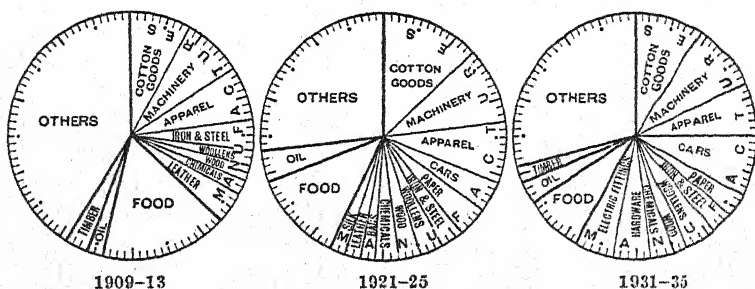


FIG. 163.—The imports of the Union of South Africa.

this part of the Union is through the Portuguese port of Lourenço Marques, which is to a considerable extent used. Along the south coast there is the extensive cultivation, with the help of irrigation, of citrus and other fruits, that has developed enormously in recent years. Both there and on the plateau maize

cultivation and the rearing of sheep especially for their wool are important. The once-important ostrich-farming industry of the drier Karroos has almost disappeared—English ladies no longer wear ostrich plumes.

The trade diagrams for the Union of South Africa should be carefully studied. Here again there is the world-wide tendency for the development of home manufactures.

## Part 16. THE DOMINION OF CANADA AND NEWFOUNDLAND

**General Considerations.**—The Dominion of Canada is considerably larger than the Commonwealth of Australia, being over  $3\frac{1}{2}$  million square miles, and has double the population. It stretches right across the North American continent from the Pacific shores to the Atlantic shores, and from the frozen wastes of the Arctic Ocean on the north to the boundary of the United States on the south. For almost half the way across the continent the latitude of  $49^{\circ}$  N. marks the boundary, so that the whole of Canada is well outside the tropics and indeed well outside even the warmer parts of temperate lands. Its problems therefore are entirely different from those of Australia and are concerned particularly with the possibility of pushing cultivation and development farther and farther north. The island of **Newfoundland** off the coast of Canada in the Atlantic Ocean was a separate Dominion of the British Empire, and under its control was a considerable section of the opposite mainland on the coast, Labrador. The northern position of Newfoundland, with the consequent cold winters and the summers inadequate for the raising of many crops, renders the development of Newfoundland strictly limited, and this is one reason for the financial difficulties in which the Dominion found itself so that it is now being ruled with the help of a commission appointed by the Home Country.

Notice from the diagram particularly the difficulties from which Canada suffers with regard to access.

**Physical Features.**—Canada falls into the same three divisions which are so marked in the United States. There is the Rocky Mountain System in the west, coinciding in general with the province of British Columbia ; then the Central Plains coinciding

approximately with the three Prairie Provinces of Saskatchewan, Alberta and Manitoba, and then the Eastern Highlands, including the great plateau of the Laurentian Shield in northern Ontario and northern Quebec, with smaller tracts of much more varied country occupying southern Ontario and forming the Maritime Provinces. In the case of Canada we may well depart from our usual practice and consider it under the headings of the natural regions into which it clearly falls.

(a) *The Western Mountain System and British Columbia.*—This is a country of high mountain ranges running parallel to

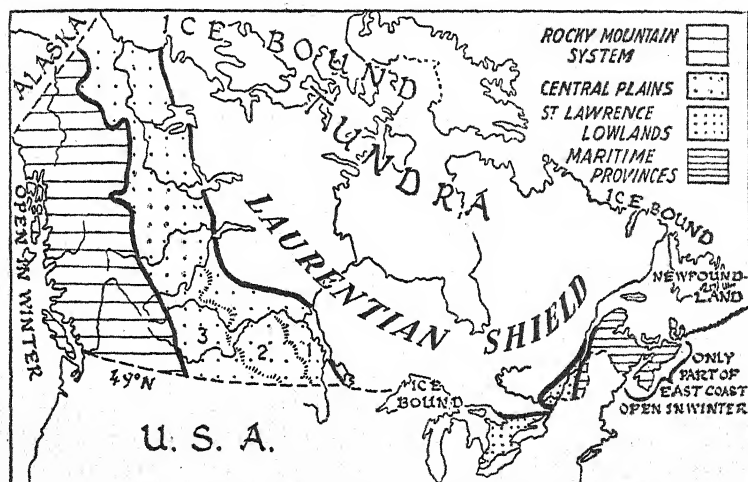


FIG. 164.—The frontiers of Canada.

the coast, with interior plateaus of varying width and river valleys usually tortuous and narrow so that the amount of land available for settlement and cultivation is strictly limited. The older rocks amongst the folded mountains are often rich in minerals and hence the copper of the coastlands, the lead and zinc of interior regions, and the gold which at an early date attracted people to the north of British Columbia and to the neighbouring territories, including Alaska. British Columbia lies in the same latitude as the British Isles, and like the British Isles is bathed by warm waters (here from across the Pacific Ocean), and the general current of air is the westerly current

bringing a good rainfall to the coastal lands and in general to the west. The whole is well clothed with forest except in the dry sheltered interior valleys, and British Columbia is the leading lumbering province, for its resources of large timber are not yet by any means exhausted. The rivers and fiord coast are of great importance for their fish and notably for salmon. The area is remote, and hence salmon canning takes the position of first importance rather than trade in fresh fish. The salmon spends part of its life in the ocean and part of its life in the rivers and must have free movement from one to the other, hence the careful control of the industry unless it is to be entirely destroyed. Deep-sea fishing is also important. In the south the broader valleys with their genial climate have important fruit orchards. Communications in this land of mountains are difficult; there is as yet no motor road which runs from the coast across the Rockies to the Prairies, though three railways make their way across. There is the famous Canadian Pacific, which runs from the chief town and port of Vancouver up the Fraser River and then up the Thompson (its tributary), across the main Rocky Mountain chain by the Kicking Horse Pass to the beautiful resort of Banff and thence to the Prairies. There is also the Canadian National Railway, which runs from Vancouver following the same valley but continuing farther northwards to the Yellowhead Pass, where it joins another branch of the same line having its railhead on the coast at the smaller town of Prince Rupert. Notice the position of Vancouver, the largest town by far, and its tributary manufacturing town to the south, New Westminster. Victoria on Vancouver Island has a controlling position to both the ports of Vancouver in Canada and Seattle in the United States. Thus the wealth of British Columbia is in its forests, its fishing and its mines, and to a smaller extent in its fruit.

(b) *The Prairies.*—The three Prairie provinces include more than deserves to be called the Prairies, a French word simply meaning meadows or grasslands. The region of grassland in the heart of North America lies to the extent of about one-third in Canadian territory. Northwards the grassland merges into a grove belt with grass and trees and then into forest land. Along the southern or south-western margin the grassland belt is dry, and here only a small amount of ranching can be carried

on unless water is available for irrigation, as it is from such rivers as the Bow River. Then comes the great wheat belt, producing in some years as much as 500 million bushels of wheat. This gives place northwards to a belt of mixed farming, as the summers are neither long enough nor warm enough for the adequate ripening of wheat. This belt of mixed farming country has recently been extended to northern tracts in the Peace River area. The prairies of Canada suffer from extremely cold winters and hot summers. It is curious that the strip of

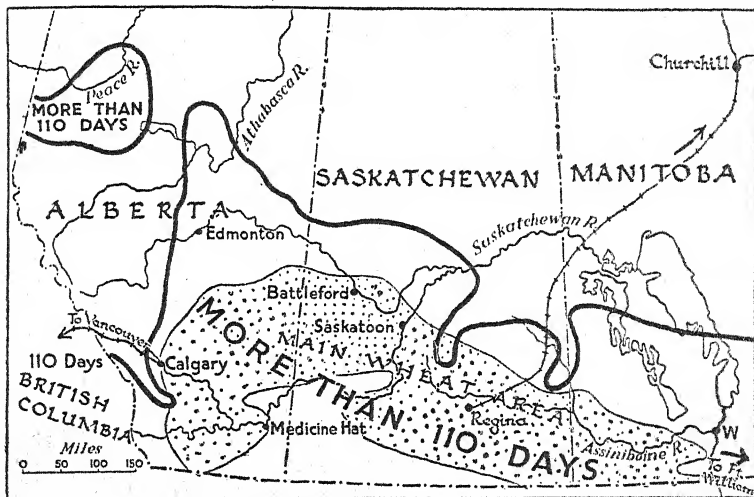


FIG. 165.—Development of the Prairies.

the prairies nearest the Rockies has rather milder winters, as it has the well-known chinook, or mountain wind, the wind being warmed in its descent from the mountains. This keeps the area free from snow in such a way that horses and cattle can be kept out not infrequently for a considerable part of the winter; hence the ranching belt in the neighbourhood of Calgary beneath the slopes of the Rockies. Agricultural research in Canada has been largely directed to discovering varieties of wheat which will ripen with a shorter and shorter summer; with the success in this the wheat belt has been extended farther and farther north, since it is the length of the

growing season which determines the northern limit of wheat cultivation. Varieties of wheat are now known which will ripen in less than the 100 days, whereas the old varieties required 120 between the last killing frost of spring and the first killing frost of autumn. It is important to notice that any research applying to this area in Canada will apply almost automatically to the area having similar conditions in Siberia. The Prairies are cut off by nearly a thousand miles of difficult country of the Canadian Shield from the well-settled areas in the east, and so were late in development. Fifty years ago the metropolis of the Prairies, or rather the eastern gateway, Winnipeg, had scarcely come into existence. Only thirty years ago many of what are now the leading towns of the Prairies had only a handful of inhabitants. The railway was the pioneer, the inhabitants followed, and the towns have naturally sprung up as collecting and distributing centres. The great problem of the Prairies, producing as they do wheat for export, is with regard to outlet. The most important is through the great wheat pool of Winnipeg to the Great Lakes, using Fort William or Port Arthur, and thence across the Great Lakes to Buffalo and by rail or water to New York. It is essential to get the wheat crop out of the country before the Great Lakes have their navigation closed for the winter. Still more is this the case where the wheat goes through Canadian territory to the ports of Quebec and Montreal for shipment to Europe. Canada has felt the need of a direct outlet for the Prairies; hence the construction of a railway to Churchill on Hudson Bay, but only a few weeks are available after harvest before the mouth of Hudson Bay is closed by the winter ice. A very considerable proportion of the grain goes out of the country by the always ice-free port of Vancouver, across the Rockies and to Europe *via* the Panama Canal.

Underlying the Prairies are vast reserves of semi-bituminous and brown coal; one day they may be very important, but as yet they are comparatively little utilised. To the north-west of the Prairies, along the Mackenzie River basin, oil is believed to exist in quantity, and an important oilfield is now being worked under the prairies of Alberta. In the north of the Prairie Provinces lies the vast and still largely undeveloped forest tracts. Beyond this there is what are sometimes called the Arctic



Prairies, land capable of supporting reindeer and caribou and other animals which can be acclimatised or are acclimatised to Arctic conditions. There are many who think that this will one day be an area of importance.

(c) *The Canadian Shield*.—This enormous extent of ancient metamorphic rocks covers some two million square miles in the northern part of the Prairie Provinces, the greater part of the province of Ontario, and Quebec. It was covered by a great ice-sheet during the great Ice Age which removed much of the soil and carried it southwards and gave it to the United States. The ice-sheet scooped out hollows now occupied by innumerable lakes and waterfalls. Where soil is sufficient forest grows, but in the more accessible parts the large trees have been largely removed and the great source of wealth is smaller timber to be used in the manufacture of wood-pulp and paper. The rivers flow swiftly from the high, southern and south-eastern edge of the plateau and abundant water-power is available for the exploitation of this pulp and paper industry. The other great occupation of the Shield is mining, particularly along its southern fringe in the neighbourhood of Sudbury, famous for its silver, copper, nickel and cobalt ores. Not far away are Porcupine, Kirkland Lake and other important gold-mining districts; Canada can lay claim to be second or at least third amongst the gold-mining countries of the world, surpassing the United States and probably surpassing Russia. The Canadian Shield reaches as far south as Lake Superior, and it is this belt of broken country which was so difficult to cross for the early pioneers, who did not realise that the fertile prairies lay beyond. Part of the Canadian Shield goes over the borders of the United States, where we find the great copper deposits as well as the great iron ore deposits towards the western end of Lake Superior.

(d) *The St. Lawrence Lowlands*.—These comprise a narrow strip along the lower St. Lawrence where are to be found Quebec, Montreal, the great commercial capital and manufacturing centre, and, along the Ottawa River, the administrative capital Ottawa. Montreal and Quebec are the great ports and outlets of Canada, but the river is blocked by ice in the winter months, and Canada has to use either United States ports or her own outports, rather inconveniently situated, of Halifax and St. John. A strip of old rocks from the Laurentian Shield



crosses the River St. Lawrence above Montreal and gives rise to shallow-water rapids preventing direct access to ocean-going steamers to the Great Lakes. There have been many schemes to construct an adequate ship canal in this area, and the effect of such a canal would be to convert all the Great Lake ports into ocean ports. It is obviously a matter which concerns both

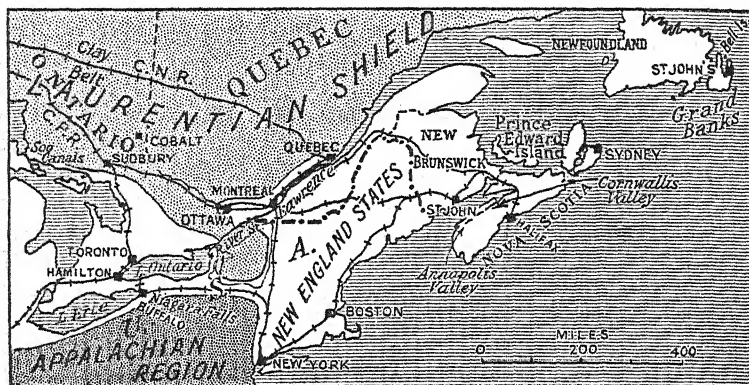


FIG. 166.—Eastern Canada.

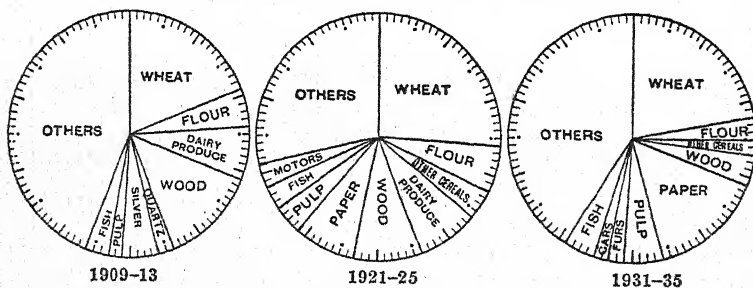


FIG. 167.—The exports of Canada.

the United States and Canada, and may in the near future be carried out.

A very important part of Canada is that which lies to the south of the Shield in southern Ontario and there includes the belt of country of younger rocks with a good soil bordering Lakes Erie and Ontario. The climate is rather milder than in

the interior, partly owing to the moderating influence of the big bodies of water contained in the Great Lakes themselves. Abundant power is available from Niagara Falls and from other sources of water-power to the north. Just across the Great Lakes are the enormous coalfields of the United States, the Pennsylvanian coalfields. So circumstances have combined to

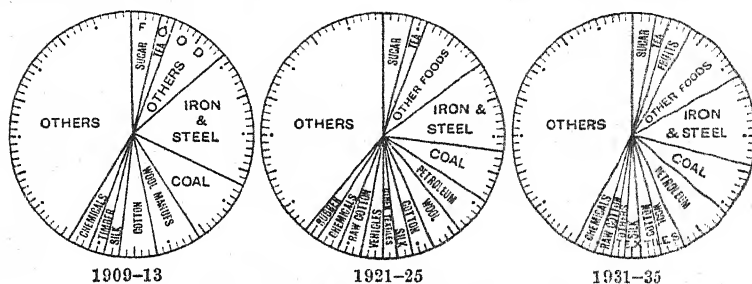


FIG. 168.—The imports of Canada.

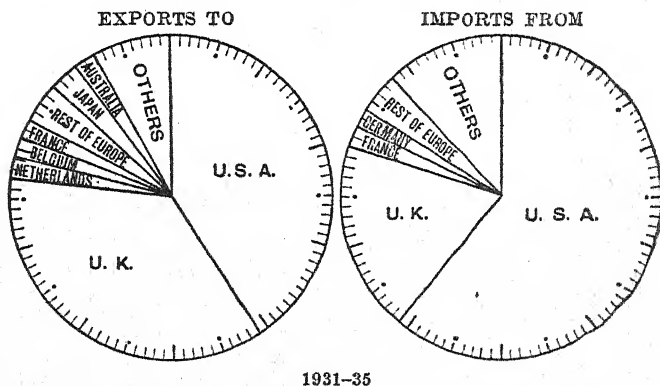


FIG. 169.—The direction of the trade of Canada.

make this the great manufacturing area of Canada with Toronto as the largest town; Hamilton, London and Windsor are other centres of increasing significance. During the Great War Canada had difficulty in obtaining goods which she had previously got from Europe, and this was a great fillip to her manufactures, with the result that Canada to-day is a leading

manufacturing country, the second most important manufacturing country in the British Empire after the United Kingdom, and sixth or seventh amongst the manufacturing countries of the whole world. This is a fact which is often forgotten, but it will be seen if we examine the foreign trade of Canada, for amongst the imports are many commodities which can only be regarded as raw materials to feed her manufacturing industries. In this sense Canada is now a rival of the Mother Country. Notice carefully the commodities which are shown in the trade diagrams.

### Part 17. THE BRITISH WEST INDIES AND BRITISH GUIANA

A number of islands in the West Indies, of which Jamaica is the largest, being about two-thirds the size of Wales, and Trinidad next in order, are tropical possessions of Britain and very loyal members of the British Empire. The smaller islands represent the higher points of a submerged chain of mountains, and consequently many of the islands are very mountainous in character and frequently forest-clothed, but others on the outer fringe are flat coral islands, very different in character. The whole group lies within the tropics and so the productions are tropical. The people are for the most part of negro origin, having originally been employed as slaves on plantations, but there is usually an admixture of British blood. Each of the islands has its own characteristics and its own characteristic products, and it is difficult to generalise. From their position we should notice that the islands are readily accessible from the United States, four or five days' journey by steamship from Canada and some ten days from Britain. Thus the islands to some extent have become tropical dependencies of Canada, and a regular steamship service subsidised by the Canadian Government runs between Canadian ports and the West Indies. Amongst leading products we have bananas from Jamaica, whilst large quantities of sugar from that island and from many of the smaller islands form a staple product. The typical production of cocoa is from the islands nearest the equator, particularly Trinidad, which is also famous for its oil-wells and vies with Burma as being the largest producer in the British

Empire. It is in Trinidad, too, that there is the famous pitch lake, from which pitch or asphalt, so largely used for our modern roads, is obtained. Amongst the smaller islands are the Bahamas of the north, where the chief town, Nassau, is a pleasure resort which built up its prosperity during the period of prohibition in the United States. Bermuda in the open



FIG. 170.—The West Indies.

Atlantic Ocean flourished for the same reason. Antigua is a flattish coral island particularly important for its sugar, and so is Barbados, remarkable for its very heavy population and the concentration of three-quarters of its area on sugar.

On the mainland of South America lies the considerable territory, as large as the British Isles, of British Guiana.

Sparsely populated, there is a narrow coastal belt of flat land where large quantities of rice are cultivated and sugar is produced and where there is a considerable population of emigrants from India ; this indeed is one of the possible fields for Indian emigration. The interior is forested and is difficult of access except along the rivers. Diamonds and gold occur in this interior region.

Although not part of the West Indies, mention must be made of the British possessions of the South Atlantic Ocean. The Falkland Islands lie in a damp cloudy belt, with rich pastures and have a very large sheep population, features which are shared by the still more southerly island of South Georgia. Other tiny islands in the South Atlantic belonging to Britain are Ascension, St. Helena, Tristan da Cunha and Gough Island, whose main significance is as whaling bases. Britain of course claims large sections of the Antarctic continent at present uninhabited.



## CHAPTER XIV

### The Japanese Empire (Nippon)

**General Considerations.**—Japan is sometimes called the Britain of the East. Both are groups of islands, the British Isles lying to the west of the continental mass of Eurasia, Japan lying to the east. Japan proper consists of the four islands, Honshu, or Mainland, Kiushu, Shikoku and Hokkaido, the first three forming what is called Old Japan. Japan proper is considerably larger than the British Isles. The Japanese Empire is very different in character from the British Empire; whereas the British Empire is far-flung, the Japanese Empire surrounds the home country. The overseas possessions are rather smaller in extent than the homeland, and consist of the southern half of the island of Sakhalin (in Japanese, Karafuto) in the north, the mountainous peninsula of Korea on the mainland, the island of Taiwan, or Formosa, through which passes the Tropic of Cancer, the leased territory on the mainland surrounding the port of Dairen, and a large number of islands in the Pacific over which Japan has a mandate. The total area of the Japanese Empire thus constituted is a little over a quarter of a million square miles, with a population in 1930 of rather over 90 million. We may really divide the whole Empire into two parts: there is the central portion, Old Japan, consisting of the three islands, which is over-populated and which must of necessity draw a considerable proportion of its foodstuffs and raw materials from elsewhere; then there is the outer fringe consisting of Hokkaido and the overseas possessions, the function of which is to supply, at least in part, food and raw materials to the over-populated centre. Since Japan has secured a paramount influence in Manchuria, or Manchukuo, we may consider that area also. We will now take the Japanese Empire in its two constituent parts, first of all Old Japan.

**Old Japan, Position and Size.**—Old Japan lies between latitudes 30° and 42° north of the equator and so is considerably nearer

the equator than is Britain. On the mainland of Asia facing Japan we have Russian territory, Manchurian territory and the great mass of China, whilst within easy distance of Japan and

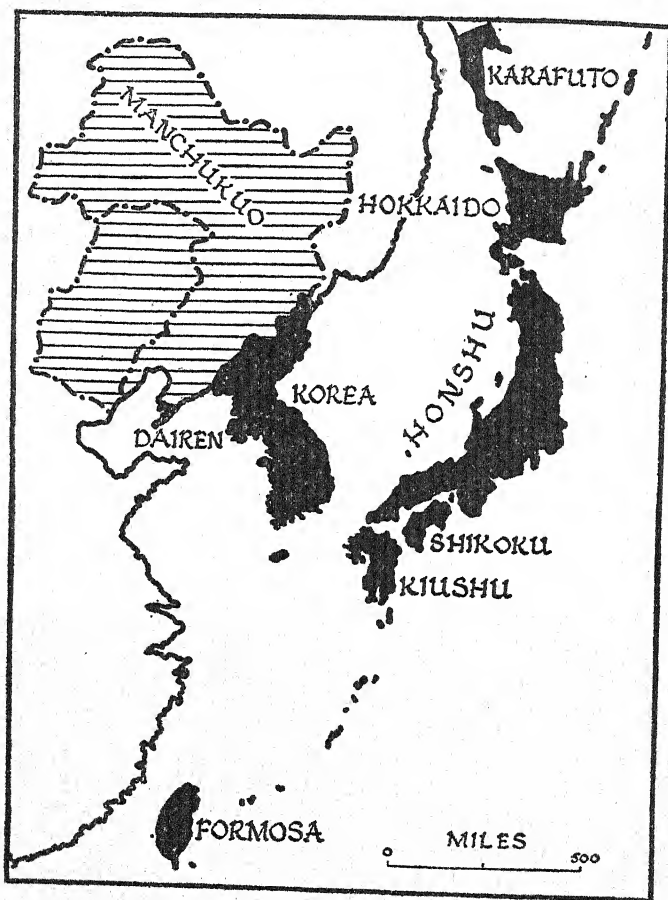


FIG. 171.—The Japanese Empire and its position.

The two boundaries of Manchukuo show the expansion to include Jehol.

to the south lie the Philippine Islands and the East Indies, and the continent of Australia and New Zealand. On the opposite side, approximately ten days' journey from Japan, across the

Pacific lie Canada and the United States, whilst across the very wide Pacific south of the equator lies the continent of South America. Japan thus plays a paramount part in the affairs of the Pacific Ocean.

**Physical Features.**—Nearly all parts of Old Japan are very



FIG. 172.—Physical map of Old Japan.

The broken lines show the main mountain area. Fujiyama is marked by a black triangle. The only considerable stretches of relatively flat land suitable for cultivation are the areas shown in black. There are small scattered basins and tiny plains in the areas dotted.

mountainous. There are two great parallel chains of mountains forming parallel arcs, which in places are separated by narrow lowlands, but in general even the lowland or midland valley is largely filled in by mountains particularly of volcanic origin; of these Mount Fujiyama rises to over 12,000 feet. The country is so mountainous that only one-fifth, despite the dense popula-



tion, is capable of cultivation and settlement. The only extensive plain is that which lies round the capital Tokyo ; it is about the size of a large English county.

At the western end of Old Japan the sea has invaded the lowland plain between the two mountain chains, and gives rise to the famous Inland Sea, which is virtually a very large, protected and sheltered harbour, its shores lined with settlements, ports and manufacturing cities.

**Structure and Minerals.**—The structure is a complicated one associated with a double range of folded mountains, highly folded and in which volcanic activity has been particularly marked—volcanic rocks cover nearly a third of the whole country. Amongst the sedimentary rocks there are coalfields, but the coal is frequently highly disturbed and difficult for working ; the principal fields are in the south-western island of Kiushu, and in the northern island, north of Old Japan, Hokkaido. Similarly on the north-west coast we find small oilfields, but the production of oil does not in any way approach the requirements. Metallic minerals occur in widely separated localities and in these Japan is at least rich in copper, and has limited quantities of gold, silver and other minerals, but it is to be noticed that iron ore is conspicuous by its rarity. Neither in coal nor iron ore has Japan the essential basis of a modern industrial country, in the same way that England has.

**Climate.**—In climate Old Japan differs greatly from Britain. There are two main seasons. There is the winter season when there are strong cold winds blowing across the sea from the mainland of Asia and reaching Japan from the west. Where they have crossed the ocean they bring heavy snowfall to the western coasts and mountains of Japan, but the eastern side is essentially dry at this season. During the winter on the western side the weather is dark and gloomy and the northern part of the country has an average temperature of below freezing in January. In summer, on the other hand, Japan is under the influence of the monsoon system, the monsoon winds in Japan having a south-easterly direction. They bring a good rainfall especially to the south and east, but comparatively little to the west. The monsoon winds are not strong as in India ; they arrive rather feebly and the small storms and disturbances in

June give rise to what are called the "plum rains," very beneficial for the early crops. Then follows a lull in the rains when the winds are stronger and when the growth and ripening of crops goes on apace and there is a later fall of rain towards the autumn.

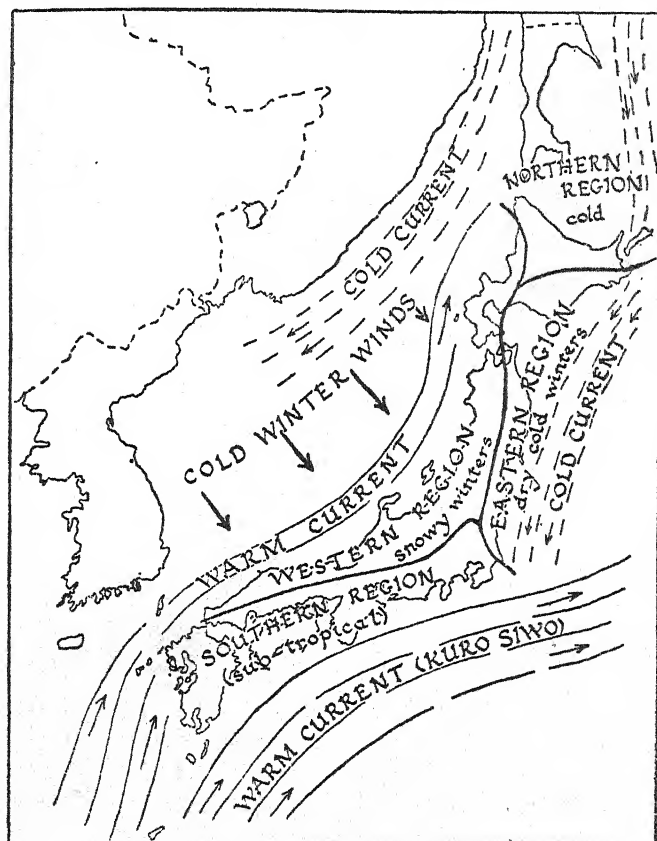


FIG. 173.—Climatic divisions of Japan.

Most of Japan is pleasantly warm in summer and in the south temperatures are not far short of 80° F., whereas even in the far north they are as warm as they are in London, in the south of England. Despite the coldness of winter, therefore, it is possible

to cultivate rice over most of Japan. Climate is strongly influenced by ocean currents which wash the shores ; a warm current, the Kuro Siwo current, corresponding to the Gulf Stream in the Atlantic, flows northwards and where it reaches Japan divides into two halves : the western half hugs closely the western coast of Japan and does exercise a warming influence on the winter winds ; the other branch, the eastern branch, is rather far away from the coast. At the same time there is a cold current which flows from the north, which again divides when it reaches Japan, and on the eastern side flows between the coast and the warm water just described, so that the east coast is colder than would otherwise be the case.

**Natural Vegetation.**—The natural vegetation of Japan is forest. As a result of the mountainous nature of the country more than half the surface actually remains in forest and timber is an important source of wealth. In the south the forests may be described as sub-tropical ; they are broad-leaved and usually evergreen, and include such interesting trees as the camphor tree and evergreen oak, as well as several species of pine. It is noticeable that in the lowlands of this southern region rice is the great crop, and it is possible to grow two crops in the year. The temperate forests occupy the central portion of Old Japan both on the east and on the west ; they are mixed coniferous and deciduous forests with species of pine as well as oak, chestnut and maple. The cold temperate or coniferous forests occur on the mountains in the north of Japan as well as in the island of Hokkaido.

**Animal Life.**—The fisheries of Japan are extremely important and are even more valuable than those round the British Isles. Like Britain, Japan is surrounded by a continental shelf, and fish abound in the shallow waters and breed easily. More than a million and a half people are engaged in the fishing industry.

### Man in Old Japan

Japan has changed very rapidly from a feudal country shutting itself off from the rest of the world, to one of the great powers of the modern world, a commercial force to be considered in the world's markets. The Japanese are proud of their old civilisation, but wise enough to have learnt the ways

of other parts of the world and to adapt their manufactures accordingly. A very large number of Japanese goods are manufactured purely for the foreign market; they are not consumed at home.

**Distribution of Population.**—The population map of Japan simply illustrates the limited amount of land that can be settled and the extreme density of the population that is reached on all the flat land available. Something like 60 million people live in Japan, and in the Empire as a whole the population is increasing almost at the rate of a million a year. Thus the pressure on the land and its resources is extremely acute; there is probably no country in the world in which the population problem is more serious.

**Occupations of the Population.**—A large proportion of the population of Japan is still rural, but the total area of cultivated land, including pasture, is only three-quarters of that available in England and Wales. The population which has to be supported is almost double. Thus, although intensive cultivation is assiduously practised, Japan is becoming more and more dependent on foreign supplies of foodstuffs. To economise valuable land villages are often built on steep slopes and the hills are cut into tiny fields. Rice is the great food grain and covers 40 per cent. of the total cultivated land. In fact, cultivation in Japan may be divided into two—there is “ha” or wet-land cultivation for rice, and “hata” or dry-land cultivation for wheat, barley and rye in the north; these three crops cover together about as much ground as the rice. Tea is important on the southern hill slopes; considerable quantities are exported to the United States; whilst in the centre of the country is the particular area where the mulberry trees are grown for the silkworm—the production of silk is a very important industry. The silkworms are usually reared by the same farmer who grows wheat or rice and are tended by his wife and family. If we exclude China, Japan produces about three-quarters of all the silk in the world.

**Urban Occupations.**—Roughly the towns of Old Japan fall into two groups: there are the old native cities, which consist of low bamboo houses, and there are the six great metropolises which are built on Western lines, of high concrete-and-steel

buildings, and which are very different in character; these include Tokyo—the third largest city in the world, next to London and New York; its great port, Yokohama, itself having nearly a million people; Nagoya, Kyoto, Osaka and Kobe. Fig. 174 shows the great manufacturing belt of Japan:

1. (Fig. 174) is the central plain, supporting about 12 million people, including the capital *Tokyo* and its great port Yokohama. This is a region which is associated especially with the manufacture of small goods. It will be noticed that it is far removed



FIG. 174.—The manufacturing belt of Japan.

from the coalfields and the oil, but it has important water-power resources from the nearby mountains.

2. The smaller *Nagoya* plain around the town of Nagoya is associated with textile industries, including cotton, silk and artificial silk and the manufacture of porcelain, whilst near at hand there are numerous tea-packing works.

3. The eastern end of the shores of the *Inland Sea*, where the two great centres are the deep-water port of *Kobe* and its neighbour *Osaka*. *Osaka* has been described as the Manchester of Japan in that it is the centre of the great cotton industry.

A short distance inland in its own small plain is the erstwhile capital of Japan, *Kyoto*, which combines the ancient in its old temples and palaces, with the modern in its industries.

4. The region at the western end of the Inland Sea, and it will be noticed that this tract is conveniently situated for the receipt of coal, and also of iron ore or pig-iron from Manchuria. It is the centre of Japan's heavy industries, including iron and



FIG. 175.—Cities and ports of Japan.

steel, shipbuilding and chemicals. The home iron ore produced is but a tiny fragment of Japan's requirements.

Between regions 3 and 4 all along the shores of the Inland Sea there are numerous small manufacturing towns.

5. Shown on the map is a subsidiary area famous for silk-weaving and where one of the leading towns is *Kanazawa*.

**The Foreign Trade of Japan.**—The diagram shows that the

staple exports of Japan are raw silk and silk goods, constituting a very large proportion of the total, and then manufactured goods headed by the textiles, namely cotton. It is interesting that in this trade Japan is in the same position as the United Kingdom in that she has to import practically the whole of the

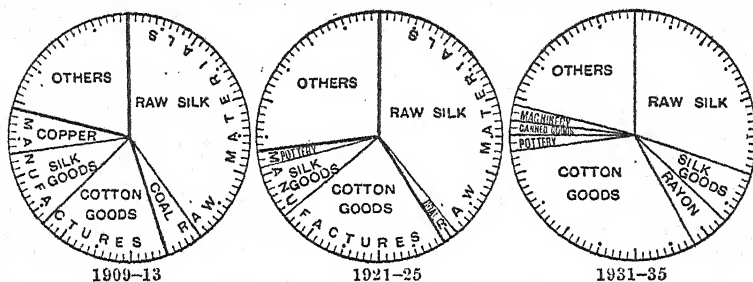


FIG. 176.—The exports of Japan.

raw material—the raw cotton. The other exports of Japan, apart from some tea, are made up of a great variety of manufactured goods.

On the other side, the import trade is noticeably of raw materials to feed her manufacturing industries, raw cotton, as

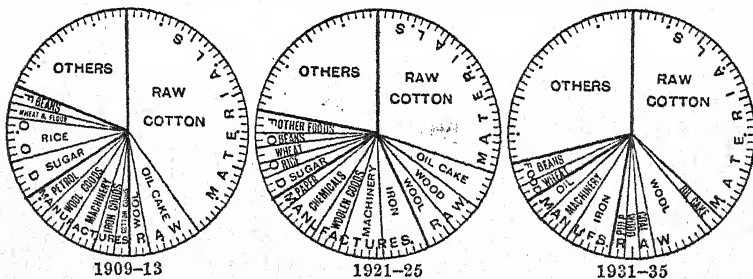


FIG. 177.—The imports of Japan.

(Foreign trade only—not including imports from the Empire, hence the small import of foodstuffs.)

well as iron, oil and coal, together with an import of food to make up her home requirements. England established her remarkable position in world trade by developing her manufactures at a time when there were very few manufacturing countries in the world, and by having at home the all-important

basis of abundant coal as well as iron. Japan, on the other hand, enters into a world where many countries are fully industrialised and busy with their own manufacturing, whilst she has neither the coal nor the iron which have been essential backgrounds in other manufacturing countries. Thus her position is a precarious one when compared with that of England. At present Japan has the advantage of a low standard of living amongst

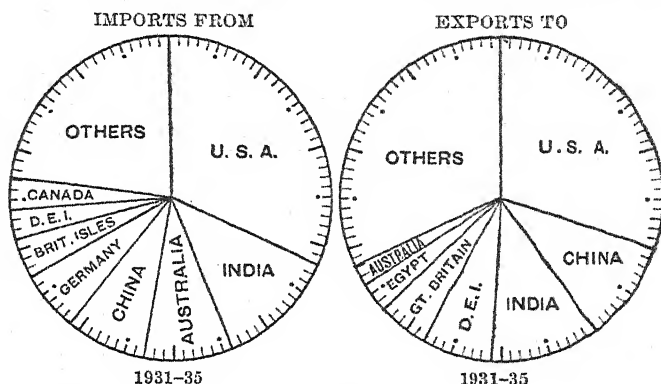


FIG. 178.—The direction of the foreign trade of Japan.

her people compared with a comparatively high standard of efficiency, so that her labour may be described at the moment as cheap labour, but with the definitely rising standard of living this advantage will disappear. The bulk of Japan's foreign trade is carried out through her leading ports, Yokohama (the port of Tokyo), Kobe and Osaka. The ports at the western end of the Inland Sea, Moji and Shimonoseki, are comparatively small.

### The Outer Territories

**Hokkaido.**—Hokkaido is known as the north land of Japan, and although administered as part of Japan proper it is very different from Old Japan and is still a pioneer land. Like Japan proper, it is very mountainous and the amount of land available for settlement is very small. It is almost limited to the Ishikari plain, of which Sapporo is the centre. But Hokkaido



suffers from bitterly cold winters with an average far below freezing though the summers are warm. The Japanese do not take kindly to these more severe climatic conditions, although something like 2,000,000 of them have settled in the island, formerly inhabited only by the hairy Ainu, the aboriginal tribes. The possibilities of settlement are limited, and it may be stated that 3 million is the limit for the agricultural develop-

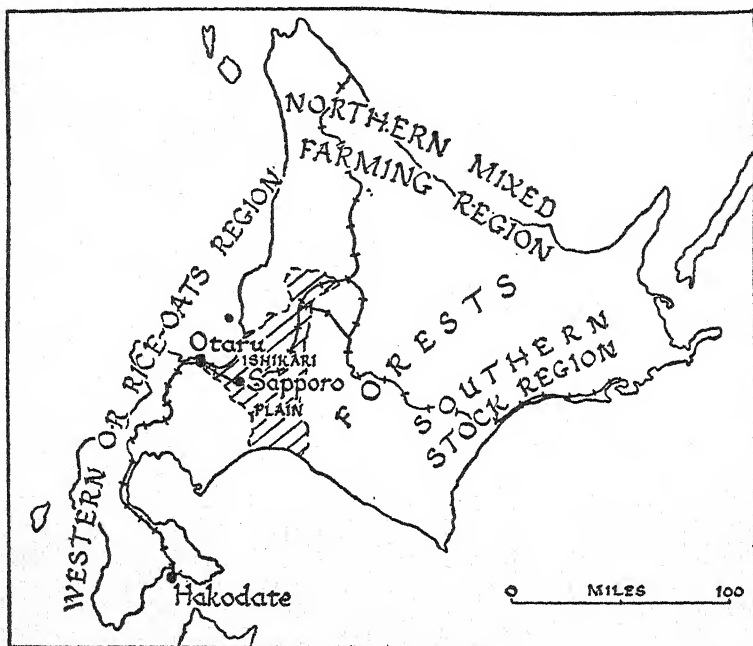


FIG. 179.—Hokkaido.

ment of the island, nor is it likely that the limited coalfields will attract large industry. The north of the island, though very cold, is capable of cultivation; the summers are warm enough for rice, but the other crops are mainly oats. The western part shares with the northern part of Japan proper the very cold, damp winters with abundant snow. The summers are warmer, and again rice can be cultivated. The south-east of the island, on the other hand, has cool summers, for it faces

the summer monsoon, and here little cultivation is possible—the land is more suitable for grazing, and it rears horses for supply to Japan proper. It will be seen that Hokkaido does not offer a great field for Japanese emigration or expansion.

**Karafuto.**—Farther north still, and suffering still worse climatic conditions, the Japanese own half of the island of Sakhalin, the northern half belonging to Russia. It has been estimated that only 0·7 per cent. of the island could be cultivated, so that possibilities of settlement are extremely limited. There are resources in fishing and in the forests, and such crops as potatoes can be grown in limited quantity. There is a certain amount of grazing land. The mineral resources of the island include oil, but unfortunately for Japan this is situated entirely in the northern or Russian half, though it is worked by the Japanese under concession.

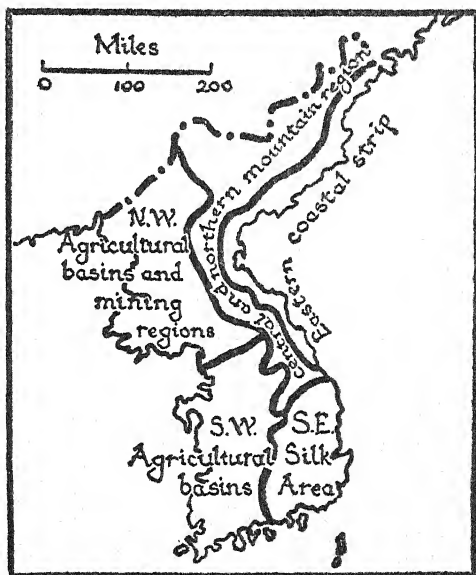


FIG. 180.—The regions of Korea.

**Korea.**—The large mountainous peninsula of Korea, or Chosen, has for long been a buffer state between China on the one hand and Japan on the other. During the present century Japan first obtained paramount influence in Korea and later annexed the country, since when it has been developed both for the benefit of the Korean inhabitants themselves as well as for the Japanese. There is a broad mountain backbone, a very narrow eastern coastal strip where there are a few fishing villages and little tracts of arable land, an important open basin to the south-east where silkworm rearing is possible, and numerous

valleys and plains on the western side of the peninsula where the cultivation of rice is very important, two crops in the south and one in the north, and where, as winter crops, wheat, barley and oats can also be grown. Thus Korea is able to supply a considerable quantity of foodstuffs for the benefit of Japan, but the population of Korea is already over 21 million, most of whom are Koreans, for only half a million Japanese have settled in the peninsula. There is a surplus of food for export which is absorbed by Japan, but owing to the large native population, possibilities of expansion are limited and it certainly does not offer a field for the solution of the Japanese population problem.

**Formosa.**—Formosa, or Taiwan, is Japan's tropical island, for the tropic passes through the heart of it. The inhabitants of Formosa are mainly Chinese and the island was received from China after the Chino-Japanese War of 1894-5. The eastern half is very mountainous and the mountains are inhabited by wild, aboriginal tribes who until recently were head-hunters. The coastal strips and the lower land on the western half of the island are inhabited mainly by Chinese farmers, though a moderate number of Japanese have settled. Amongst the products of the island there is a surplus of rice which goes to Japan, whilst tropical products such as sugar-cane are grown and the production of camphor from the forests is also important. Formosa has limited resources of coal and a little oil. Thus its resources are an asset, even if they do not solve Japanese problems.

**Japanese South Sea Islands.**—The Japanese now hold a mandate over a large number of islands scattered over the surface of the Pacific Ocean which were formerly German property. The total area is about 1,000 square miles and the islands are inhabited by about 50,000 natives belonging to two chief tribes. One or two of the islands have been settled by the Japanese, who grow sugar-cane: others yield supplies of phosphate for manure, whilst from many there is an output of copra. The total resources are, however, very limited.

## MANCHUKUO

The pressure of population in Japan proper has already been stated, and it has been shown in what a precarious position the

country stands if it is regarded purely as a manufacturing area. There are obviously various solutions of the population problem. One is overseas emigration. But that means to foreign countries, and there are very few foreign countries who are anxious to receive the Japanese, quite apart from the fact that the people

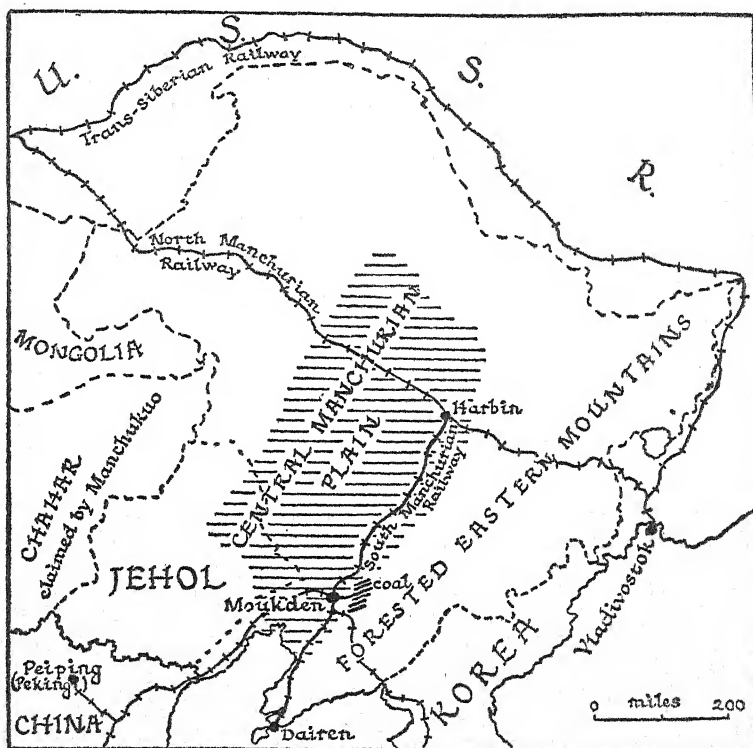


FIG. 181.—Manchukuo.

themselves dislike leaving home. There are many in the Hawaiian islands, there are some on the Pacific coast of the United States, and there are considerable colonies in Brazil, but the total number of Japanese who have emigrated does not much exceed half a million. Another solution to the problem is the diminution of the increase in population by a strict control

of the birth-rate ; there are signs that birth control is coming, although until recently the subject was entirely taboo in Japan. On the other hand, the increase in the knowledge of medicine and medical skill and diminution of the infantile death-rate tend to increase the population. The third solution, and the obvious one, is for Japan to secure for herself a certain supply of foodstuffs and raw materials, particularly foodstuffs, and there is no doubt that this economic motive is the primary one which has actuated Japan in securing control over the large territory of Manchuria, where she has established a nominally independent country, Manchukuo, under an Emperor of Japanese choosing.

Manchuria consists of a great central plain closed in by mountains on the east and west. The mountains are sources of timber, as well as, on the eastern side, having important coalfields and resources of iron ore. The plain of the centre enjoys a climate not very different from that of the Canadian prairies, with extremely cold winters and warm summers which renders it suitable for the cultivation of different types of grain.

Manchuria has over 30 million inhabitants, for the most part Chinese. It is they who cultivate the land and produce the wheat, the millet, the barley, the oats and the soya beans. The Japanese plan the railways and improve the communications, but live in towns and run the commerce of the country. The South Manchurian Railway Company is their instrument for this work, and the trade passes through the port of Dairen.

In 1937 the Japanese, having established their position in Manchuria, invaded China, at first in the north and later in the centre and south. During 1938 they overran much of the country and placed themselves in a position to control the economic development.

## CHAPTER XV

### France

**General Considerations.**—France is the only country in the world which, from the point of view of the variety and extent of its overseas dominions, is in any way comparable with the British Empire. France, the home country, has an area roughly twice the size of Britain, but with a smaller population than

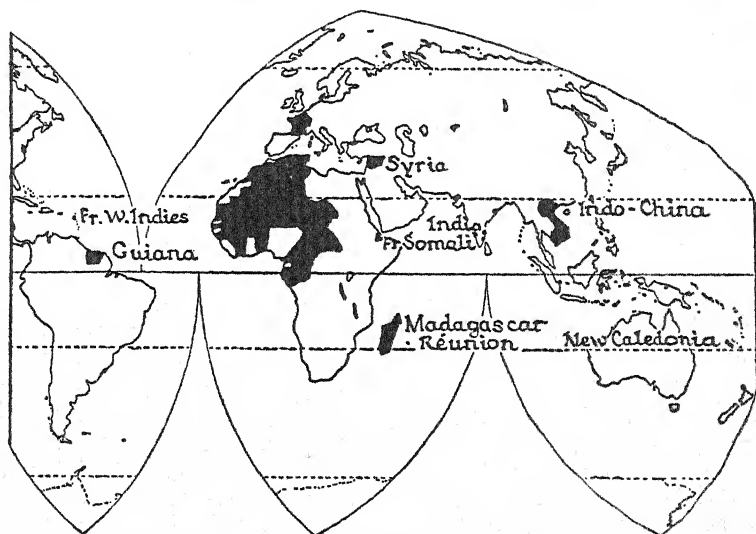


FIG. 182.—France and her colonies.

our country. The overseas possessions total over  $4\frac{1}{2}$  million square miles, but including as they do the greater part of the Sahara Desert, the total population of the Empire is only 64 million. So France with her possessions has an area over one and a half times the area of the United States, but with a population rather less. In addition to actual possessions France

cultural country resembling south-eastern Britain, with marked local changes, due to the rapid and local variations in soil character, but having the advantage over England in that the area stretches farther south towards warmer climes, where the cultivation of maize and the vine can become dominant. Thus the chalk lands of northern France are the counterparts of the better parts of the downlands of eastern England; the Paris basin is the counterpart of the Hampshire or London basin, but has a more varied topography because of the abundance of limestone. During the great Ice Age this northern land of France lay beyond the great ice-sheet, but it benefited from the deposition of great masses of wind-borne loess, probably in large measure re-sorted under water owing to the humid climate, and which give rise to the rich "limon" soils so common in the north of the country and which were largely responsible for the infamous "Flanders mud" of 1914 to 1918.

In a country so essentially agricultural the French have been keen to notice the small differences between one region and another. The modern geographer is concerned with the difficulty of trying to divide a country into minor regions, but in the case of France this has long been done by the people, and the tracts are known as "pays"—thus Picardie, Artois, Flanders, the Champagne, etc., are the names of natural regions or "pays" which have long been recognised.

In the heart of France towards the south is the large plateau built up of ancient rocks and known as the Massif Central or Central Plateau. Its highest edge is along the east overlooking the Rhone valley, and the tract as a whole is infertile when compared with the rest of France.

South-eastern France is occupied by the Alps. Between the Alps and the Central Plateau is the narrow but important valley of the Rhone, which at its southern end joins the strip of cultivable land along the Mediterranean Sea.

In the east of France are the important ranges of the Jura and the Vosges, beyond which lies the Rhine valley.

**Minerals.**—In general France is not richly endowed with minerals. She has one large and important coalfield, that of Northern France, which is probably connected under the Straits of Dover with the East Kent coalfield, and which stretches beyond the French borders right across Belgium as

the Belgian coalfield, and like that field suffers from the intense folding of the rocks. This has resulted in conditions difficult for mining and not infrequently in the crushing of the coal. France's coal production is 50 million tons a year, let us say a quarter to a fifth of that of the British Isles, and nine-tenths of this total comes from the northern coalfield. The other fields are small basins pinched in, as it were, amongst the ancient rocks of the plateau. The great coalfield of Northern France has given rise to the main industrial region of the country; the small fields in the south have in turn given rise to such small industrial basins as that of St. Etienne and le Creusot. For the period which ended in 1935 France had the advantage of working the Saar coalfield, which was then restored, as the result of a plebiscite, to Germany. The loss to France was more than 10 million tons of coal a year. Thus France has insufficient coal for her requirements and is forced to import large quantities, and has long been a significant customer for British coal.

The one mineral of which France has really large reserves is iron ore. Nearly the whole output is from the great Lorraine field, and the restoration to France of Alsace-Lorraine by the Treaty of Versailles in 1919 gave her possession of the whole area with the exception of the small northern portions which lie in the Grand Duchy of Luxemburg. The ores are low grade and are thus comparable with the British ores which are now being worked in the Midlands, particularly Northamptonshire, Rutlandshire and Lincolnshire. They have a considerable content of phosphoric acid, and it was not till processes were perfected by which this could be removed that they could be utilised. Much of the ore is smelted where it is mined; large quantities are, however, sent to the northern coalfield for the iron and steel industry there. Of other minerals, France has large deposits of potash salts, near Mulhouse in Alsace, also regained since the war, and a tiny oilfield, also in Alsace, which is more of a curiosity than a commercial proposition in that the oil-sand is actually mined. To compensate for her poor reserves of coal, France has large reserves of water-power, particularly in the French Alps, the Pyrenees and the Cevennes, which are the high eastern margins of the Central Plateau. In the south long stretches of main-line railway are electrified and it is planned gradually to electrify the whole of the French railway system.



has a paramount influence in the rich and important country of Morocco.

### Part 1. FRANCE

**Position and Size.**—France has a position in Europe which is unique, with a long coast-line along the English Channel facing the British Isles, and a long coast-line along the shores of the Bay of Biscay facing the Atlantic. She has all the advantages which accrue from the maritime position of Britain. French Trans-Atlantic steamship services are thus able to compete with those of Britain and Germany on equal terms. At the same time France has a shorter but very important length of coast-line along the Mediterranean Sea, and from this base she has secured paramount influence over the richest part of the whole of North Africa, and by the Suez Canal, of French construction, she is placed in ready communication with her Far Eastern possessions. Advantageously situated with regard to her coast-lines, France has, however, the disadvantage of land frontiers. The frontier between France and Spain coincides in the main with the crest-line of the lofty Pyrenees, and until very recently so marked was this barrier that it was crossed neither by road nor rail for the greater part of its distance; only round the ends was communication between France and Spain possible. On the east the boundary between France and Italy is formed by the lofty Alps; farther north France marches with Switzerland, and it is not until one reaches north of the Jura Mountains that the ill-defined frontier between France and Germany is reached, a frontier which has suffered many fluctuations during the course of Franco-German history and which since the Treaty of Versailles runs for a considerable distance along the River Rhine. Similarly the frontier between France and Belgium is ill-defined by geographical features.

Within these boundaries France has the advantage of large tracts of comparatively level, fertile land, and, although there are considerable imports of foodstuffs, in general terms the French population of 40 million—a population which incidentally is decreasing—can find sustenance within the bounds of the country. Thus, shorn of her colonial possessions, France could be almost an economically self-sufficient unit. This position should be contrasted with Italy, Germany and Britain.

**Physical Features and Structure.**—France can be divided into the physical and structural units shown in Fig. 183. In the north-west is the mass of ancient rock which is known as Brittany, corresponding in position and character to the mass

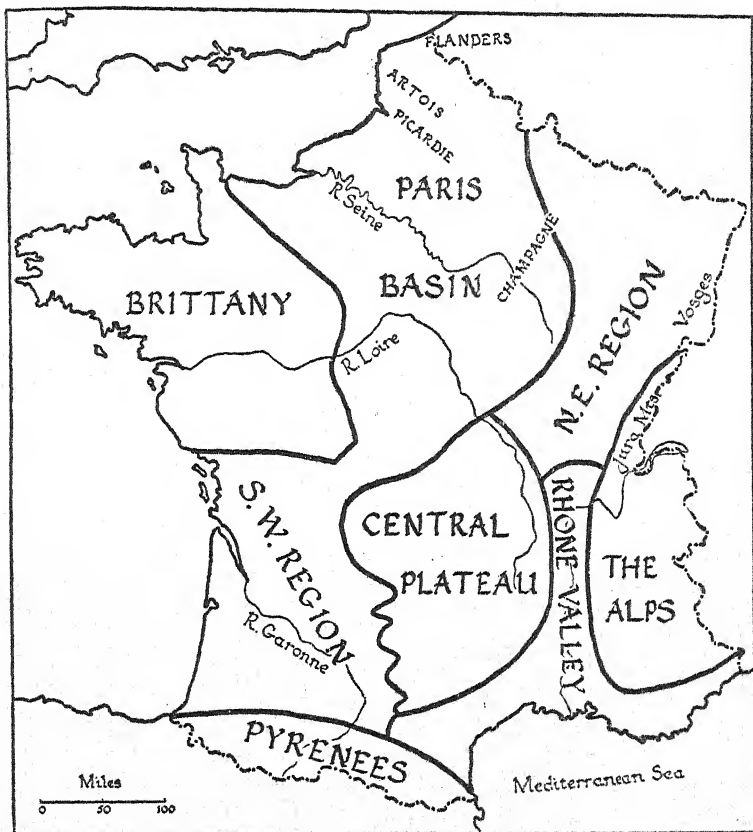


FIG. 183.—The physical regions of France.

forming Devon and Cornwall in the British Isles. Apart from this mass the whole of northern France and of western France belongs to the great plain of northern Europe. Occupied in the main by younger rocks which give rise to rolling or gently accidented topography, this area of France is essentially agri-

cultural country resembling south-eastern Britain, with marked local changes, due to the rapid and local variations in soil character, but having the advantage over England in that the area stretches farther south towards warmer climes, where the cultivation of maize and the vine can become dominant. Thus the chalk lands of northern France are the counterparts of the better parts of the downlands of eastern England; the Paris basin is the counterpart of the Hampshire or London basin, but has a more varied topography because of the abundance of limestone. During the great Ice Age this northern land of France lay beyond the great ice-sheet, but it benefited from the deposition of great masses of wind-borne loess, probably in large measure re-sorted under water owing to the humid climate, and which give rise to the rich "limon" soils so common in the north of the country and which were largely responsible for the infamous "Flanders mud" of 1914 to 1918.

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**Climate.**—France has the great advantage accruing from her position of possessing (a) a tract of Mediterranean climate along the Mediterranean shores and in the lower part of the Rhone valley in which can be grown the typical Mediterranean products ; (b) a large stretch of country in the north which has a climate comparable with that of south-eastern England, with rather drier and colder winters, but which is excellent for the ripening of cereals ; and (c) a large tract of country in the west which is both milder and damper than the last. These

climatic conditions permit the country to have a greater range of agricultural produce than is possible in Britain.

**Vegetation and Agriculture.**—It is significant of the fertility of France that less than one-tenth can be described as moorland or rough pasture ; one-fifth of the whole surface is forested—not only are the sandy lands of the south-west, the Landes, deliberately

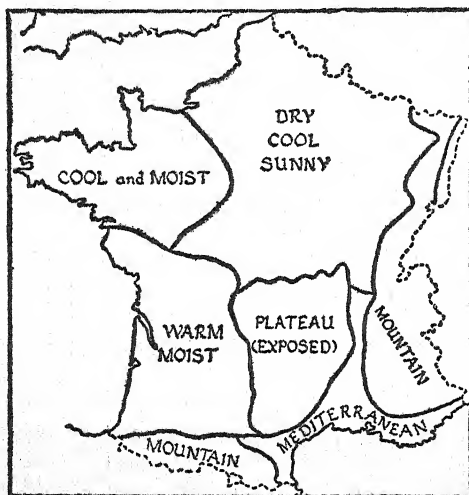


FIG. 184.—Climatic regions of France.

ately forested, but on the slopes of the mountains in the south-east, the Alps, France has the possession of large tracts of forest country. But two-thirds of the whole of France is cultivated and the major proportion of this land is actually in crops ; thus France grows a quarter of all the wheat grown in Europe outside Russia—wheat is particularly the crop of the Paris Basin—though in recent years it has been necessary for France to import some wheat. As in Britain, the west becomes rather too damp for wheat and its place is taken by oats, and in the south-west by maize. The variety in French climates is well illustrated by the fruits which range from the apples and the cherries and similar fruits of the Paris Basin to the olive of the

Mediterranean zone. There is a similar range in domestic economy from the use of butter in the north-west in Brittany (*cf.* Devon and Cornwall) to the use of olive oil for similar purposes in the south. France produces more wine than any other country in the world, the vineyards being in the southern two-thirds of the country. The great claret country is around the Garonne in the south-west, whilst special types of wine, amongst which we may mention champagne, are grown much farther north.

**Animals.**—The low fertile lands of France, as well as the fertile valleys amongst the Alps and Jura, are more suitable for cattle, particularly dairy cattle, than for sheep, so France has double the number of horses, cattle and pigs found in Britain, but less than half the number of sheep. There is still a marked local pride in animal produce, as the various types of French cheese witness. The fisheries of France are important, for France enjoys the advantage of fisheries in both the Atlantic and in the Mediterranean, the great fishing grounds being off the north-west coast for pilchards and sardines, and in the Mediterranean for tunny.

**Man and his Activities.**—As might be expected from the fertility of the country, the agricultural rural population is widely and evenly distributed. The northern coalfield is the great industrial region, and is concerned with both the heavy industries—iron and steel, the manufacture of machinery, etc.—and the textile industry—the manufacture of woollens and cotton. Apart from this one concentration it is typical of the country with its poor reserves of coal that the other urban and industrial centres should be wisely distributed. Some of them are the great ports where the raw materials are received, and we may note Marseilles with such industries as soap-making associated with imported vegetable oil. The towns of the Rhone valley have long been famous for their silk (*e.g.* Lyons), dependent originally on their home production, but dependent more and more now on imported raw silk. The northern ports such as Le Havre, Dunkirk and Rouen are concerned with woollen and other textile manufactures from imported wool. Paris resembles London in its concentration on a wide variety of small manufactures, noticeably clothing.

**Communications.**—A distinctive feature of the internal communications of France is the use made of waterways, and the great navigable rivers have been joined up by canals and a large network of canals has been constructed in the north and industrial regions. Britain is often compared with France in this respect to the detriment of the former, but it must be remembered that France already possesses great stretches of

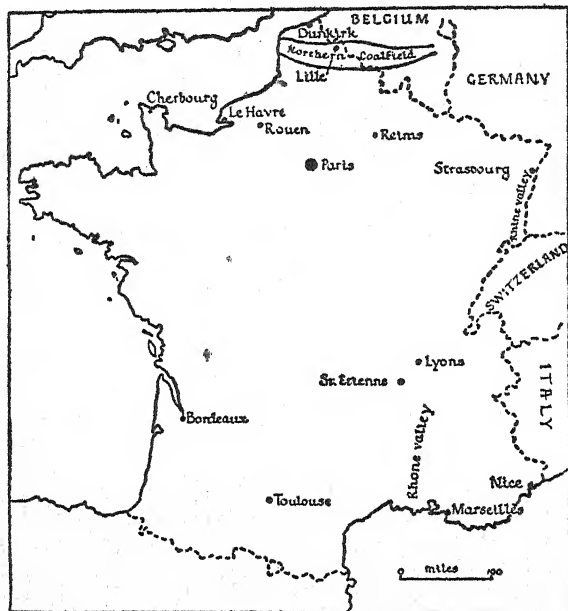


FIG. 185.—Industrial regions of France.

navigable waterways in her rivers which are completely absent in Britain and that her canals can be constructed without anything like the number of locks necessary for British canals.

The railway network of France centres on Paris, and the same is true of the road network. France owes her magnificent "routes nationales" to the wise planning of the first Napoleon.

France has about half a dozen great ports. Marseilles in the south occupies the leading position and has nearly all the Mediterranean and Far Eastern trade and benefited enormously

from the opening of the Suez Canal. Le Havre, Rouen and Dunkirk are the great ports of the northern coast for the American trade. Bordeaux is mainly significant as a wine-exporting port.

**Foreign Trade of France.**—The foreign trade of France resembles that of Britain in that two-thirds of the exports are manufactured goods, four-fifths of the imports are foodstuffs

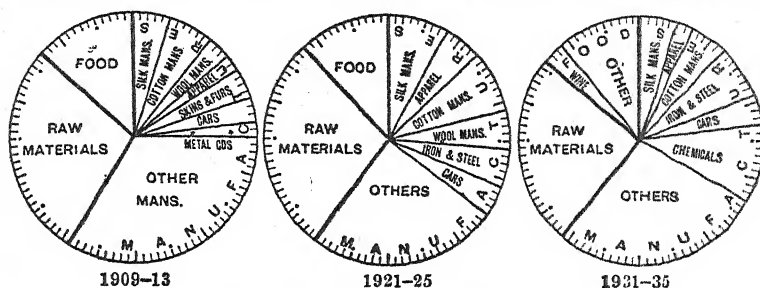


FIG. 186.—The exports of France.

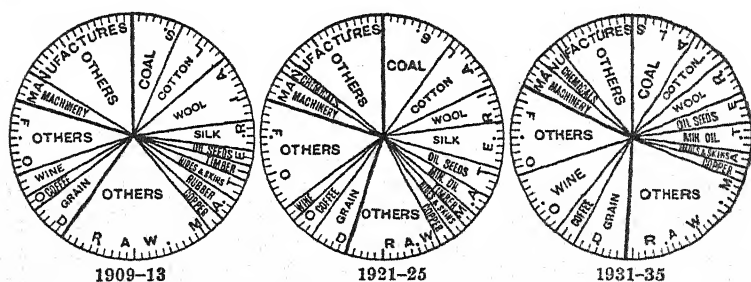


FIG. 187.—The imports of France.

and raw material, but the weakness of France's position is illustrated by the large import of coal. Amongst the other imports cotton, wool, silk, vegetable oils and mineral oils take the leading places. Amongst foodstuffs, coffee occupies the place that tea does in Britain, the import of sugar shows that France is not self-supporting in this commodity, and there has been in recent years a not inconsiderable import of grain and flour. Surprisingly, too, France imports wine, for despite



the enormous production home consumption is greater than the supply—the export is of fine quality wines, the import of “vin ordinaire,” particularly from North Africa, for home consumption. Amongst the exports the high place taken by silk manufactures and clothing and in general of luxury goods is notable. French trade, like that of Britain, is almost world-wide, but the imports are only about one-third of the imports of Britain and the exports about one-half.

## Part 2. FRENCH OVERSEAS POSSESSIONS

The variety and extent of French overseas possessions may be seen from the accompanying table.

	Year of acquisition.	Area, sq. miles.	Population in thousands.
<i>In Asia</i>			
India. . . . .	1679	196	286
Annam	1884	39,758	5,120
Cambodia	1862	67,550	2,806
Cochin China	1861	26,476	4,467
Tongking	1884	40,530	8,012
Laos	1892	89,320	944
Syria (mandate) . .	1922	60,000	2,832
<i>In Africa</i>			
Algeria . . . . .	1830-1902	847,552	6,553
Tunisia . . . . .	1881	48,300	2,411
Senegal . . . . .	1637-1889	74,112	1,588
French Sudan . . . .	1893	380,557	3,569
Guinea . . . . .	1843	89,436	2,176
Ivory Coast . . . . .	1843	180,802	3,843
Dahomey . . . . .	1893	41,302	1,132
Mauritania . . . . .	1893	347,400	349
Niger . . . . .	1912	490,490	1,758
Equatorial Africa . .	1884	912,049	3,192
Cameroon (mandate) .	1919	166,489	1,879
Togo (mandate). . . .	1919	33,700	750
Réunion . . . . .	1649	970	198
Madagascar . . . . .	1643-1896	241,094	3,572
Mayotte . . . . .	1843	790	130
French Somaliland . .	1864	8,880	69
<i>In America</i>			
St. Pierre and Miquelon	1635	93	4
Guadeloupe . . . . .	1634	532	267
Martinique . . . . .	1635	385	235
Guiana . . . . .	1626	34,740	22
<i>In Oceania</i>			
New Caledonia . . . .	1854-1887	8,548	57
Tahiti, etc. . . . .	1841-1881	1,520	36

**French Asiatic Possessions.**—Of the once extensive possessions in India there remain to France but one or two small ports. The one great possession of the French in Asia is French Indo-China, which includes the divisions recorded above, *i.e.* Annam, Tongking, Laos, Cambodia and Cochin China. French Indo-China is essentially a tropical monsoon country most closely comparable in its products and possibilities with British Indo-China or Burma. Its quarter of a million square miles at present support a population of only 20 million, so there is plenty of land available for further settlement. The mountainous tracts are largely forested and there is a big reserve of tropical timber waiting to be tapped. It is in the south, in Cochin China and Cambodia, that the great delta of the Mekong river gives a huge extent of rice land so that rice represents two-thirds of all the exports of the country. This rice export is a source of wealth, for it goes to the densely populated countries near by of China, Japan, the Dutch East Indies and Hongkong rather than to France and Europe. On the whole French Indo-China is comparatively undeveloped, despite the activities of large numbers of immigrant Chinese (compare Malaya).

**French Possessions in America.**—These include certain small West Indian islands which, like the British West Indies, are capable of producing tropical commodities of which sugar-cane is at present the chief. Cocoa and coffee are also produced. French Guiana, like British Guiana, is a large but, in the main, undeveloped tract; as far as the French area is concerned the development has not been helped by its use as a penal settlement (including the infamous Devil's Island).

**French Possessions in Oceania.**—Here the principal is New Caledonia, important for its nickel ores.

**French Possessions in Africa.**—The bulk of French colonial possessions lie within the continent of Africa, and we may divide the territories there controlled by France into four groups.

*Northern Group.*—The northern group includes Algeria and Tunisia—countries with a Mediterranean climate becoming very dry towards the south. The more fertile coastal tracts have a good soil though large areas require to be irrigated. Wheat and barley can be grown as well as the vine and various

fruits, whilst the hills are covered with forests, including cork-oak, pine and cedar. High up on the hills are lands suitable for sheep rearing, and sheep form, after wine, the chief export from Algeria and Tunisia. The minerals of these areas are important to France, for iron ore and phosphate are mined in quantity in Algeria, and it is believed that large coalfields await development farther south.

Then France has the paramount influence over the autocratic kingdom of Morocco, a still richer area where again the cultivation of large tracts of land for grain or wine is possible.

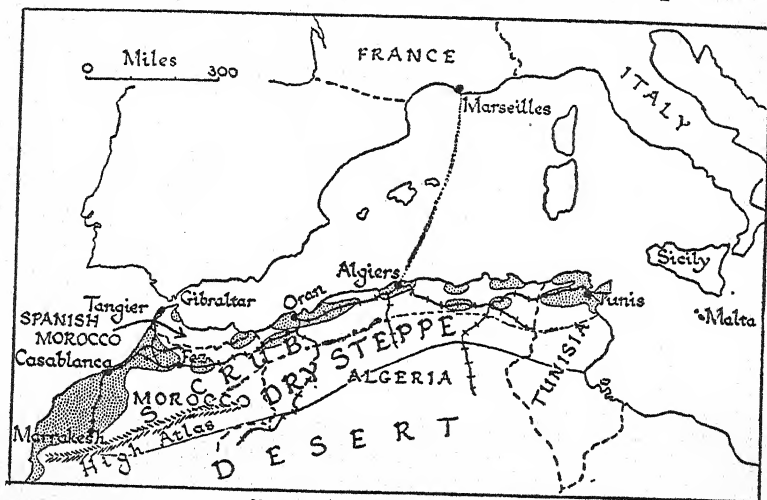


FIG. 188.—North Africa.

The lightly dotted land is cultivated. Notice the ready accessibility from France.

Throughout North Africa France has been active in the development of railways; it is now possible to travel from Tunisia direct to Casablanca in Morocco by rail. There is a network of excellent roads and amongst the great works of construction must be mentioned the ports, notably Casablanca, Oran and Algiers. In the northern part of Morocco there is a Spanish zone, whilst the town of Tangier is controlled internationally by France, Spain and Britain.

*Desert Group.*—France possesses, at least nominally, practically the whole of the great Sahara Desert. It may be that

this possession is a burden rather than an asset, for considerable sums are spent in the maintenance of military posts and of guards against the turbulent natives. In recent years air routes and more particularly motor routes have been developed across the Sahara Desert.

*Western Group* (French West Africa).—Tracts of French territory separate British territory in West Africa and share the same products. Along the wet coastal strip there is the production of cocoa and the possibility of rubber growing ; farther inland is the production of cotton and such vegetable-oil crops as ground-nuts. Farther east France has a large tract of territory near the equator known as French Equatorial Africa, where the products may include rubber and cocoa and various products typical of equatorial regions, but the tract is as yet comparatively undeveloped.

*Eastern Group* (Madagascar and the islands of Réunion, etc.).—Madagascar, important for its minerals, is still largely undeveloped.

**French Mandates.**—Most important amongst the French mandated territories is that of Syria in Asia, which in broad general characters resembles Palestine, but is considerably larger. There is a fertile strip along the coast of the Mediterranean Sea with a production of oranges and which has an excellent port in Beirut and another in Tripoli. The latter is likely to become increasingly significant because the northern branch of the Iraq pipe-line terminates there.

This very brief survey of France's overseas possessions will make certain points clear. In the first place there is in the home country with its large stretches of fertile land and its moderate, decreasing population, little or no real pressure on the land : emigration is not an urgent problem. In the second place France has a vast overseas empire, distributed in a variety of areas with a variety of climates, capable, therefore, of extensive and varied production. Much of this empire is still as yet comparatively undeveloped.

## CHAPTER XVI

### Italy

**General Considerations.**—It is interesting to consider Italy next to France because of the numerous contrasts between the two countries. Italy itself is only a little over half the size of France and is, in fact, about the same size as the British Isles. The population of Italy is a little larger than that of France, but it is increasing rapidly. In 1913 the population of Italy was a little over 34½ million; but by 1921 this had increased to 38 million, and by 1935 had increased to over 42½. In addition to being far smaller, the homeland of Italy is far less fertile and has far smaller areas of cultivable land than is the case with France. Although on paper the overseas possessions<sup>1</sup> of Italy total something like three-quarters of a million square miles, this territory is very largely desert and offers but little opportunity for emigration and settlement. Thus Italy's foreign policy is largely dictated by very real economic needs.

#### Part 1. ITALY

**Position and Size.**—In contrast to France, Italy is essentially a Mediterranean country. Its natural limits are well defined by the great wall of the Alps on the north and by the sea on all other sides. Where the frontier should naturally be drawn amongst the Alps is not always clear.

**Physical Features.**—Italy consists essentially of three parts.

(a) *The southern slopes of the Alps* in the north, where land available for settlement is restricted to some of the alpine valleys, including the land round the famous Italian lakes. There are also temporary settlements high up in the mountains which are occupied in summer when the summer pastures are in use. Many of these valleys in the Alps run from north to

<sup>1</sup> Excluding Abyssinia.

south and so face the sun, and are thus favoured with abundant sunshine and warmth. As a result they are oases of Mediterranean vegetation.

(b) The great *Plain of Lombardy*, or the plain of the Po, corresponds roughly with northern Italy. It is a broad, flat



FIG. 189.—The frontiers of Italy, showing approaches by land.

Chief railway tunnels or passes: 1. Riviera; 2. Mont Cenis; 3. Simplon; 4. St. Gothard; 5. Brenner; 6. Simplon-Orient express route. Notice the possessions of Italy on the eastern side of the Adriatic Sea and the short sea route from Bari to Durazzo in Albania which, although not an Italian possession, is strongly under the influence of Italy.

stretch of alluvial land, practically the whole of which can be and is closely settled by agriculturalists and where are to be found most of the large manufacturing towns of Italy.

(c) *Peninsular Italy*, with its typical Mediterranean climate, has the disadvantage of a broad, central mass of mountains—the Apennines. The Apennines lie very close to the sea in the

north-west, but cross to the east coast and then return to the south-west to pass through the toe of Italy into Sicily. The structure, in the presence of large masses of limestone, has combined with the climate—for in the Mediterranean climate



FIG. 190.—Italy.

of rainfall coming in the winter months and the summers being dry the formation of soil is very slow—to render much of peninsular Italy infertile. The cultivated stretches are largely the coastal strips on the west and the narrow coastal strip on the east, including the peninsula of Apulia.

**Structure and Minerals.**—Italy has no coal and no oil and very little iron ore ; thus the essential bases of a manufacturing country would appear to be absent. It is not surprising to find that Italy normally figures as the largest, or one of the largest, importers of British coal. In place of coal, however, Italy is fortunate in possessing very extensive water-power resources from the Alps of the north ; most of these resources have been utilised. This is the reason for the situation of the great manufacturing towns in the northern plain of Italy near the Alpine border where the power is readily available. Notice the position of Turin and Milan, for example. Amongst the minerals may be mentioned the very pure iron ore of the tiny island of Elba, unfortunately limited in quantity ; certain iron ores which are found in Sicily ; the sulphur of that island and the still undeveloped but considerable resources of minerals which are believed to exist in Sardinia.

**Climate.**—The climatic divisions of Italy correspond with the physical divisions. The Alps of the north link Italy with central Europe, and reference has already been made to the sheltered, fertile valleys which are very desirable climatically. The Po valley or the plain of northern Italy is cut off by the Apennines from Mediterranean influences and so resembles rather the plains of central Europe, *e.g.* the Plain of Hungary, for the very cold winters have temperatures dropping frequently below freezing, whilst the summers are very hot—sufficiently hot for the growth of rice. Peninsular Italy has a typical Mediterranean climate, with an obvious tendency for greater moisture on the west and for drought on the east, and with an equally obvious tendency of increasing average temperatures as one goes southwards.

**Vegetation and Cultivation.**—Of the total area of Italy nearly one-fifth is regarded as being in woodland and forest ; this proportion of course includes the extensive alpine forests of the north, but it also embraces the various Mediterranean woodlands, including pines, which are found in many parts of the country. About an equal proportion is occupied by rough pasture lands, many of them very dry and supporting but small numbers of sheep and goats. Most of the remainder of the country is regarded as being under cultivation, with wheat by



far the most important grain. The wheat grown is especially the hard, macaroni wheat. There are, as one might expect in a country enjoying hot summers, but limited quantities of oats and, in a country where moisture tends to be deficient rather than super-abundant, only a limited acreage of maize. The proportion of rice in the northern plain is interesting, as this is the only extensive rice-growing area in Europe. The influence of the Mediterranean climate is seen in the two million acres devoted to the cultivation of olive trees, and the two and a half million acres which are under vines. Lemons are very important in Sicily.

**Animals.**—The influence of dry conditions is seen in the use of a million asses and nearly half a million mules for purposes of transport, the two combined considerably exceeding the number of horses. Goats are also very numerous.

**The Activities of Man.**—The dominant note in Italy is the pressure of the population on the land. Tracts suitable for cultivation are densely populated and carefully worked; under the present régime much has been done towards the draining of the marshes, formerly responsible for the common occurrence of malaria in Italy, which still existed along the western coast. By the draining of these tracts new areas have been made available for settlement.

The number of large towns, with a big population housed in a small area, is noteworthy. Rome, the capital, has well over a million, Milan over a million, Naples approaches that total, whilst Genoa and Turin both have two-thirds of a million. Every year there are large numbers of emigrants. Owing to the character of Italian overseas possessions the majority of these emigrants go to foreign countries; the average number emigrating in recent years has been between 100,000 and a quarter of a million. A very large number go to other countries in Europe, including France, as labourers. There are of course large Italian colonies in the United States, but Italian immigration to the United States is now closely restricted. There are important colonies of Italians in South America, and also in far distant Australia.

Turning to the activities of the population, a large number are engaged in agriculture, but manufactures employ more

than four million workers, a leading manufacture being that of textiles in the northern cities and in Naples. The growth of mulberry trees throughout the northern plain has led to this area becoming one of the great silk-producing areas of the world. The spinning is carried on at Como, Milan and Bergamo; silk-weaving is centred at Milan, which vies with Lyons as being the premier silk-manufacturing centre in Europe. As elsewhere in the world, the silk industry has attracted in recent years an artificial silk industry, whilst the supply of labour skilled in spinning and weaving has been one reason for the establishment of cotton and woollen manufacturing industries also in these northern manufacturing cities. Milan has developed into the nodal centre of the northern plain, with a network of railways and roads, and has therefore become concerned with railway workshops and heavy industries. Turin, also in the north, controls the Mont Cenis route to France and its old carriage industry has quite naturally been replaced by a modern automobile industry. The sea-outlet of this northern plain is by the difficult pass with its railway tunnels across the Apennines to Italy's greatest port, Genoa.

In Peninsular Italy Naples has in recent years become a great industrial city, concerned with textiles, engineering and sugar-refining amongst other occupations. Some of the famous old cities of Italy have become modernised and industrialised, others, such as Florence, have remained seats of learning and art. The great ports of Italy should be noticed, Genoa and then Naples, whilst conveniently situated on the heel of Italy for communication with the Far East are Brindisi and Bari. Venice, Trieste and Fiume serve between them as outlets for the eastern end of the plain, the third was naturally the port for part of Austro-Hungary, but it has been replaced in recent years by Yugoslavia developing her own port of Sušak.

**The Foreign Trade of Italy.**—The bulk of the imports into Italy are foodstuffs and raw materials. It is significant of the incapability of the country to produce all that she requires in foodstuffs that between 15 per cent. and 20 per cent. of all the imports into the country are represented by wheat and flour;<sup>1</sup> other grains, fish, coffee and meat are also important, whilst

<sup>1</sup> But notice the decrease in 1931–35.

amongst the raw materials first place is taken by the raw cotton which Italy requires for her textile industry. The textile raw materials also include wool and some raw silk. Coal occupies a high place amongst the imports, and so do metals, but it may be said that the bases for Italy's manufacturing industry are hydro-electric power and a labour supply.

The exports of the country, as one might expect, are largely manufactures, with cotton goods and silk goods occupying the

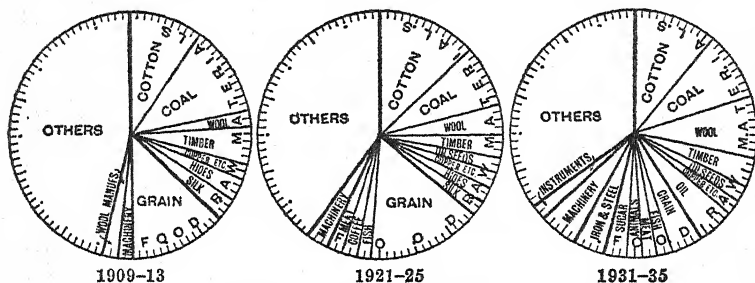


FIG. 191.—Imports of Italy.

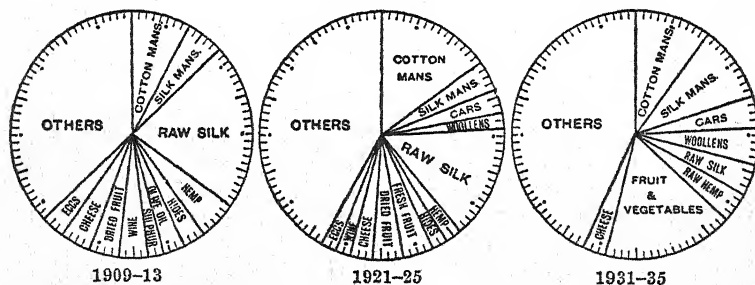


FIG. 192.—Exports of Italy.

leading places; but the fact that Italy now imports exotic raw materials and turns out manufactures is shown by the export of rubber goods. It is a little surprising to find, however, that the leading export of Italy in normal years is a raw material, namely silk, so that silk is produced in excess of requirements in the Northern Plain and goes to a large extent to France. Italy has certain specialist products amongst foodstuffs which she exports, fresh fruits, including the lemons of Sicily and

dried fruits, together with cheese (the famous Gorgonzola is one rightly associated with Italy) as well as certain types of wine.

The trade of Italy is widespread. The cotton is largely imported from the United States and from India; her requirement of food grains comprise her import from the Argentine. Not unnaturally there is a considerable export to and import from her principal neighbour, Switzerland. Otherwise the large number of countries all over the world which have a small trade with Italy is remarkable.

## Part 2. ITALY'S OVERSEAS POSSESSIONS

Until 1936 Italy's only colonial possessions were three areas in Africa, largely desert, if one excludes the small concession which Italy has in Tientsin in China. These three African areas are Libya, Eritrea and Somaliland. In 1936 Italy took possession of Abyssinia.

**Eritrea** is a tract of territory along the Red Sea with a narrow coastal plain backed on the west by the wall-like fault scarp of the Abyssinian Mountains. The population is small and nomadic; the most important parts of the land to Italy are small areas of the coastal plain where irrigation schemes have been developed and cotton and millet are grown. But the Italian population as a whole numbers only a few thousand.

Similarly **Italian Somaliland** is largely a desert tract.

**Abyssinia** occupies a knot of mountains in north-eastern Africa and is bordered by the Sudan, Eritrea, French Somaliland, British Somaliland, Italian Somaliland, and Kenya. Since its annexation by Italy in 1936 it has been organised with Eritrea and Italian Somaliland as Italian East Africa. The chief town, Addis Ababa, is reached by railway from the French port of Jibouti, near the mouth of the Red Sea. The south-east is largely desert, but the centre and west have mountain valleys capable of greater population and production. Mineral wealth is conjectural rather than proved.

North of the Sahara Desert there is the extensive territory of **Libya**, but it is only a small area along the actual Mediterranean coast which may afford possibilities for settlement for limited

numbers of farmers. In all there are less than 50,000 Italians settled in the colonies, not through any failure to emigrate thereto, but simply because of the lack of resources in the areas concerned. By way of contrast it is known that over nine

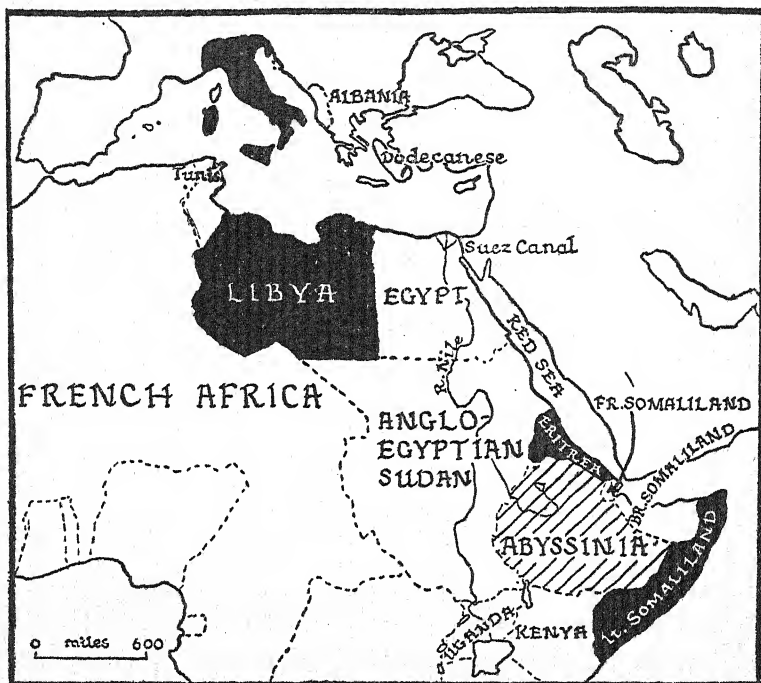


FIG. 193.—The overseas possessions of Italy.

million Italians are domiciled in foreign countries, particularly in America. It may be mentioned that Italy possesses certain of the islands in the Ægean Sea, including the interesting historical one of Rhodes.

## CHAPTER XVII

### Germany

**General Considerations.**—Excluding Russia, Germany is the largest and most populous country in Europe. With an area of 225,000 square miles it is now nearly twice the size of the British Isles, and with its population of over 75 million has a population over 50 per cent. larger. The culture associated with the German language is an old one and has had widespread influence over the continent of Europe, but it is sometimes forgotten that as a great world power the rise of Germany is comparatively recent. The consolidation into an Empire of the numerous independent and semi-independent states took place in the main after the victory of Prussia over France in the war of 1870-71. From that time onwards the expansion of Germany was rapid, until the Great War of 1914-18. Following the Treaty of Versailles Germany lost to France the large tract of Alsace-Lorraine which she had gained in 1870-71, whilst considerable areas of former German territory became part of the resuscitated country of Poland. In March 1938 Austria was annexed without bloodshed and on October 1st, 1938 (by agreement with the Great Powers) that part of Czecho-Slovakia inhabited mainly by Germans.

**Position and Size.**—Germany on the whole lies on the North European Plain and stretches southwards so as to include much of the mountainous country of Central Europe. Lying as it does on the plain, the boundaries to east and west are ill-defined. Topographically there is little to mark the boundary between Germany and Poland on the east. In the west the boundary with Holland and Belgium is to a considerable extent also artificial, but with France it follows for a considerable distance the River Rhine and is therefore more satisfactory. In the south the boundaries of Germany have, since 1938, left the crest of the mountains which surround the Czech plateau and form an irregular line on lower ground.

Germany falls into two main divisions:

(a) *The North German Plain*, which is part of the Great European Plain and which was formerly covered by the great ice-sheet which left behind a thick mantle of glacial clays and sands. There is considerable variation from one part of the plain to another in that the sands are comparatively infertile



FIG. 194.—Germany.

This map shows the frontiers of Germany before the revisions of 1938. For the new frontiers, see Figs. 214a and 215. The three chief industrial areas are cross-hatched.

and are now devoted to the growing of softwood timbers. The low-lying glacial clays are often water-logged and hence are devoted to pasture for cattle, whilst the tracts of better soil—the loessic areas—wherever possible are tilled.

(b) *The Southern Highlands* consist of a varied complex of plateaus, low hills, mountains and valleys occupying the southern part of the country and which slope on the whole northwards

from the Alps. Flowing from the Southern Highlands, usually following a north-westerly course, are the great rivers of Germany, which act as lines of communication.

Germany has a very short coast-line along the North Sea. Fortunately for her, her rivers, the Ems, the Weser and the great Elbe, all flow into the North Sea. The Elbe in particular is of considerable help to Germany, though it is to some extent a disadvantage that it rises in Czechoslovakia and from the Czechoslovakian border is and must be an international river. Of the other important streams, the Oder in the east flows into the largely enclosed Baltic Sea, the entrance to which is partly controlled by Denmark and Sweden, but to which Germany has given herself a new entrance through the Kiel Canal. The great river of the west, the Rhine, of course finds its way to the sea through alien territory, through the country of Holland.

**Structure and Minerals.**—The solid rocks are rarely seen through the mantle of drift which covers the German plain, and so this is an area which, climatic conditions and soil being suitable, is largely agricultural; but the more hilly regions of the south (*cf.* the British Isles, hilly regions of the west) consist largely of older rocks, some of which are important reservoirs of minerals and on the margins of which we find the great German coalfields. Amongst the countries of Europe, Germany ranks next to the United Kingdom in the value of her mineral output. Not only has she huge coalfields and huge reserves of coal—the annual production being about two-thirds of that of the United Kingdom—but she has also very large fields of brown coal, or lignite, much less valuable but easily worked in large open quarries. The greatest of all German coalfields is that of the Ruhr, named after the small river which passes through the coalfield and which is a tributary of the great Rhine. But there are also coalfields in Saxony, and Germany owns a considerable portion of the great Upper Silesian coalfield, shared with Poland and Czechoslovakia (*cf.* Fig. 51). Although Germany has lost the great Lorraine field there are home supplies of iron ore, in the valley of the Sieg, a tributary of the Rhine, but, as in the United Kingdom, Germany has to import large quantities of iron ore, particularly from Sweden and Spain. Amongst some of the older rocks of the southern masses Germany



possesses lead and zinc, as in Silesia, together with copper, whilst there is the famous production of potash salts from Saxony, in the neighbourhood of Stassfurt, which has led to this town becoming the leading centre of chemical industry in the world.

**Climate.**—The climate of the North German Plain is one which enjoys rather warmer summers than does Britain, but distinctly colder winters, and in the eastern half of the plain January temperatures average below freezing. Amongst the hills and valleys of southern Germany there are great variations in climate and the aspect of the individual valley or mountain slope is significant. Thus on some it is warm enough for the cultivation of the vine. One of the most favoured tracts is the famous Rhine Rift Valley itself.

**Vegetation.**—The higher hills and mountains of Germany are naturally clothed with forest, and the valuable soft-wood forest of these areas is an important asset to the country. Thus nearly a third of the whole country is forested, but the Germans deserve the utmost credit for the valuable work of afforestation which they have carried out on the poor sandy soils of the northern plain; here forests occupy a quarter of the land, pastures a quarter and cultivation a half. Roughly 45 per cent. of the whole of Germany is recorded as arable land, 17 per cent. as pasture. Thus the agricultural economy of Germany is a cropland economy, rather than the permanent pasture one which predominates to such a large extent in England. It is not surprising to find that of the crops hay occupies the leading place, covering a third of the whole cropped land. It is typical of the poor quality of the soils over northern Germany that the leading cereal crop is rye, and that therefore the so-called black bread is the staple form of bread rather than wheaten. In this northern plain oats are extensively and widely grown, but wheat and barley, which demand better soil and climatic conditions, are mainly crops of southern Germany. Again, the enormous acreage under potatoes is evidence of the use which the Germans have made of tracts of indifferent soil in the north; they occupy ten times the acreage that they do in the United Kingdom, and are used as an important source of industrial alcohol. A great commercial crop, of course, is sugar-

beet, and before the War Germany supplied the British Isles with something like a third of her requirements of sugar.

Germany has small stretches of those moorland pastures which in Britain support huge numbers of sheep, and so the numbers of sheep in Germany are small compared with the large numbers of cattle.

**Animals.**—In addition to the animals just mentioned, it is noteworthy that Germany shares to a considerable extent in the North Sea fisheries.

**Population.**—Germany bears close comparison with Great Britain in the large proportion of the population which is classed as urban. *Berlin*, the great focus of the north, has a population of over four million, *Hamburg*, the greatest port, over a million. With these exceptions the principal towns, as in Britain, tend to be concentrated on the coalfields, and just as London is far removed from a coalfield, so is Berlin; but Berlin is the centre of a land empire—true it has river communication—but it is not a port in the sense that London is a port. That Germany is now primarily a manufacturing country is clear from the fact that there are now nearly 12½ million actual workers, but Germany's industrial development is much later than that of Britain—it did not really commence until after the Franco-Prussian War of 1870–71. The principal industrial regions are as follows:

i. *The Rhenish-Westphalian industrial region*, lying on and near the great Ruhr coalfield. On the coalfield are the heavy industries, and iron and steel may be regarded as the basic industry of the whole, concentrated particularly at Essen, between Barmen and Hagen, at Dortmund, Düsseldorf and Duisburg, whilst Solingen is the great centre for specialised steels (e.g. cutlery). The industrial region also extends beyond the coalfield along both banks of the Rhine, as far south as Cologne, whilst there are areas also to the west of the Rhine around Crefeld and Munchen-Gladbach. A detached area, on a coalfield of its own, is at Aachen. Most of these towns away from the coalfield have a variety of industries—textiles (woollens, silks, artificial silks and cottons) are significant, whilst the town of Cologne is interesting in the variety of its manufactures, including those using essentially imported raw materials. The great German cotton market and place of import of the raw cotton is Bremen on the Weser, and the use of the Ems canal

should be noticed, but actually the Ruhr industrial region is in direct communication with the sea from the port of Duisburg by the Rhine through Holland.

ii. *The Saxony industrial region.*—Saxony is not only a rich agricultural region with sugar-beet, wheat, rye and potatoes as leading crops, but it also has several basins of good coal and large areas of brown coal, or lignite. The early development

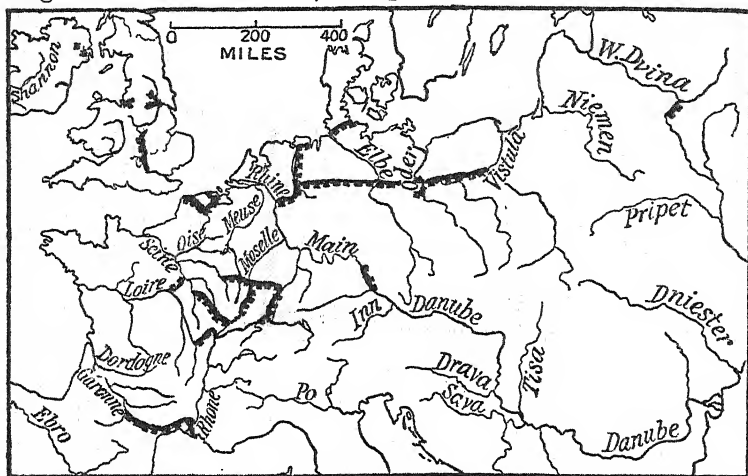


FIG. 195.—The waterways (navigable rivers and canals) of France and Germany.

The main east-west canal of Germany was completed in 1938.

of a textile industry was favoured by the sheep pastures on the neighbouring Erzgebirge and by minerals, not now of great importance, from those mountains. In this connection we may compare it with Yorkshire and the sheep pastures of the Pennines. But as in Lancashire, woollen manufactures have given place to cotton manufactures so that Chemnitz is the Saxon Manchester, and Zwickau, near at hand, is also a leading centre. The famous Dresden china is also made in this region, and another large town, a great trading centre from the Middle Ages onwards, is Leipzig.

iii. *The Silesian industrial region* lies in the extreme south-eastern corner of Germany and two-thirds of the coalfield are actually now in Poland. Owing to the difficulty of access, this coalfield, although probably the richest in Europe, has not been

industrialised to the same extent as many of the others. Königs-hutte and Kattowitz were lost to Germany, and with them a considerable part of the iron and steel industry.

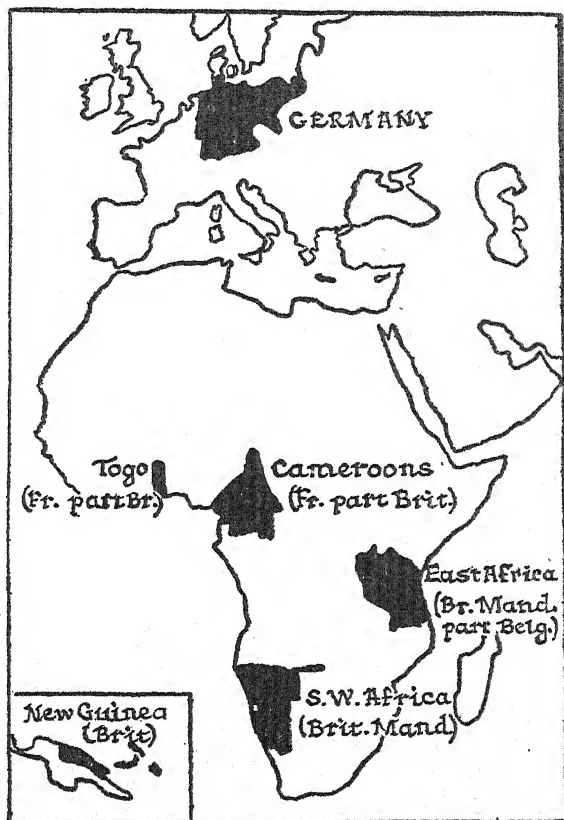


FIG. 196.—The former colonies of Germany and their present states.

**Communications.**—As in the case of France, extensive use has been made by Germany of her waterways—nearly 6,000 miles of rivers or canalised rivers and 1,400 miles of canal—so that approximately one-fifth of all the traffic within the country is carried by water. The waterways focus on the great ports as outlets: Hamburg, the greatest of them all, serving the Elbe basin which includes Saxony; Bremen the Weser basin;



Stettin is less important as the outlet of the Oder basin, for it suffers from the disadvantage of being on the Baltic Sea coast.

**Foreign Trade.**—The foreign trade of Germany can be closely compared with that of the United Kingdom. Amongst the imports there is the large intake of raw materials for her great manufacturing industries, cotton and wool and wood and metals, together with an import of food—grain, fruit and tropical produce—illustrating that Germany is not entirely self-supporting. Amongst the exports manufactures represent 80 per cent. (*cf.* Britain), with iron and steel, machinery and textiles occupying leading places. Again, as is the case with the United Kingdom, the trade is world-wide; thus we find Germany is the great rival of Britain in the world's trade markets for manufactured goods; but Germany has not the advantage of what is, to a considerable extent, an assured overseas market in her own colonies in the same way as Britain has.

**Austria.**—The recent history of Austria is referred to on pp. 389–394. Its situation in the heart of Europe invites certain comparisons with Switzerland (*see* pp. 393–394). The importance of physical features and climate is reflected in the use of the land in Austria. More than a third is forested, whilst less than a half, even including alpine pastures, comes under agricultural land. But the most is made of the tiny fields perched high up on the hillsides for the production of hay and for feed crops for cattle, so that the concentration of Austria is on a mountain dairy-farming industry. Austria has little or no coal, but excellent water-power and large mineral deposits, particularly of iron ore, but also of copper, lead and a certain amount of lignite.

From its central position and its scenery Austria is a rival to Switzerland as a playground for Europe as well as for a meeting place. Vienna is the “Geneva” of Austria, and is even more centrally situated. It was the capital of the old Empire, and a quarter of the people of Austria now live in Vienna, which has long had a reputation as an international centre of learning and the arts. Austria's manufactures, like those of Switzerland, are concerned with those which require a limited amount of raw material and a large expenditure of labour; this is well shown by the scientific instruments and electrical machinery for which Vienna is famous.

## CHAPTER XVIII

### Holland and Belgium

**General Considerations.**—These two small European countries have several features in common. They have both of them preserved a monarchical form of government; they both of them have small homelands, with considerable overseas possession.

#### Part 1. BELGIUM<sup>1</sup>

Belgium is only about one and a half times the size of Wales, but it supports a population of about a quarter of that of England and Wales; in other words, nearly eight million people live on less than 12,000 square miles of territory. Except for a strip of sandy sea-coast along the North Sea on the north-east, Belgium has no natural frontiers: on the east it adjoins Germany, in the south-east corner is the little Grand Duchy of Luxemburg, which is now united to Belgium in a common Customs union; along the south and the south-west the boundary marches with that of France, whilst Belgium's neighbour on the north is Holland. Thus Belgium is a typical buffer state between the Great Powers represented by France on the one hand and Germany on the other.

Belgium falls very clearly into at least three physical and structural regions. The first is occupied by a mass of old rocks, forming a plateau, the Ardennes. The plateau remains sparsely populated and to a considerable extent is still forest covered, cultivation being restricted to the broader valleys, whilst the sheep rearing on the hillsides reminds one of the upland areas of Britain. In the extreme south Belgium almost reaches the great Lorraine iron field. The second division lies north of the Ardennes and forms a long narrow strip running right across

<sup>1</sup> Notice the arrangement of the matter in this description of Belgium. It is given without subheadings, but the information is given in the usual order.

the country from east to west. This is the coalfield belt. Belgium's coalfield is a continuation of that of northern France, and to an even greater degree the coal seams are highly folded,

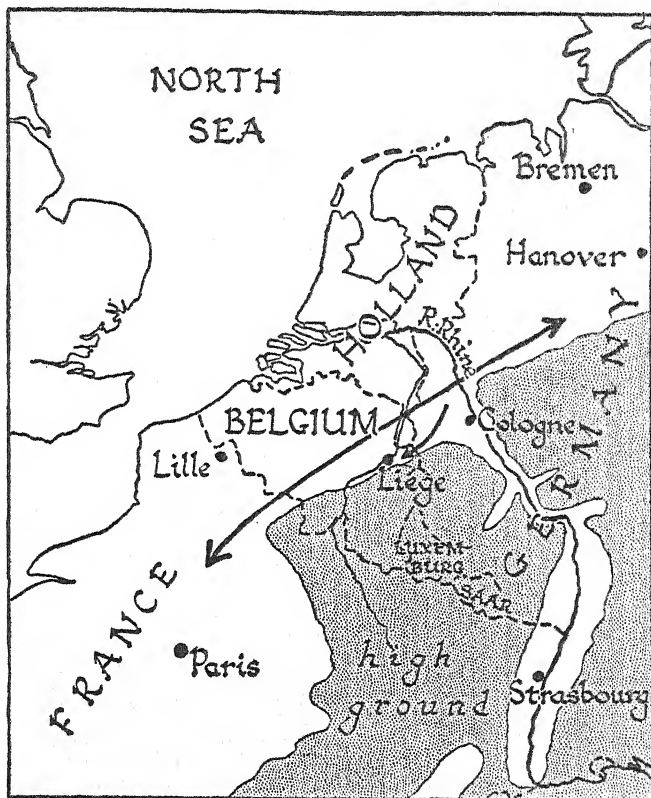


FIG. 200.—The position of Belgium and Holland.

The large arrow shows the natural line of communication between France and Germany, avoiding high ground. The small arrow shows the line of communication avoiding Holland and emphasises the important position of Liège. The dotted area is land over 500 feet above sea-level.

even bent right over on top of one another, with the result that mining conditions are difficult and not infrequently the coals are so crushed that they can only be used after they have been briquetted. But this coalfield gives Belgium the basis



for a great industrial development. Manufacturing towns concerned with iron and steel and other heavy industries, machinery, chemicals and glass making and textiles are found along the coalfield belt from Mons through Charleroi to Namur and Liège. Belgium's output of coal, despite the size of the country, is no less than one-eighth of that of the whole of the British Isles, whilst her output of iron is about a quarter of that of Britain.

The northern half of Belgium is on the whole a lowland region, and given up largely to agriculture. In the west along the sea-coast is a belt of sand-dune country, and the principal use of the sea-coast is for seaside resorts. The shallow, shelving coast makes it unsuitable for the development of harbours, so that here Belgium only possesses small packet stations for Channel traffic, such as Ostend. Further inland is the Flanders Plain, a low-lying, flat area partly cultivated, partly grass. Still farther inland the land is more hilly and may be said to resemble parts of the Paris Basin; here cultivation is the most important occupation, and an important crop is flax, which gave rise to the old linen industry so long established in many of the cities of Flanders such as Bruges and Ghent. The capital of Belgium, Brussels, lies in the heart of this northern region, whilst within an hour's train journey northwards is Antwerp, Belgium's great port, but a port which involves the maintenance of peaceful relationships with Holland, for the waterways leading to Antwerp pass through Dutch territory. Still farther east is a considerable area of barren, sandy country, the Campine, formerly of little use, but beneath which there has been found, within the present century, a considerable coal-field stretching across the borders into Holland.

In the agricultural regions of northern Belgium, wheat, oats, rye, potatoes, sugar-beet and fodder are amongst the chief crops. When we look at the people of Belgium we find the curious state of affairs that those in the south, the Walloons, are mainly French speaking whilst those in the north are Flemish speaking; thus the country is bi-lingual. The Northern Flemish half is essentially cultivated, and one might refer to the whole as one neat market garden.

The general imports resemble those into Britain, consisting of foodstuffs, such as grain from the Argentine, raw materials

for the manufacturers, such as cotton, wool, hides, oil-seeds, etc., whilst the exports are, in the main, manufactured goods. The trade is naturally very largely with Belgium's neighbours, and there is a considerable transit trade.

## Part 2. BELGIUM'S OVERSEAS POSSESSIONS

Belgium's overseas empire is the Belgian Congo, coinciding at least approximately with the Congo Basin, bestriding the equator in Africa. The area is not far short of a million square miles, and it is interesting that the Belgian Congo was originally a personal possession of the King of the Belgians. It was not until 1907 that it was taken over officially by the State. The central part of the Belgian Congo is occupied by equatorial forest and the chief products include palm nuts and palm oil, rice, cocoa and rubber. The collection of wild rubber and of ivory from the forest was once important, but has decreased very much in importance. On the higher ground and mountains of the margins there are considerable areas, particularly in the south, of more open country, including the Katanga. This very important part of the Belgian Congo, which borders Northern Rhodesia and Angola, has probably the largest reserves of copper in the world and so a thriving mining district has grown up right in the very heart of Africa. Until recently this area was reached by rail and river up the Congo, but there is now direct access by the railway from Lobito Bay in Angola, and there is also direct access by railway from the south, from South Africa through Southern and Northern Rhodesia. There are other mines besides those for copper—the output of diamonds is considerable, gold and radium are important and there has recently been considerable increase in the output of tin. Cattle thrive too on the highlands provided there is no tsetse fly, and cotton can be cultivated as well as coffee.

It will be seen that Belgium thus possesses in the Congo a vast area, partially developed but capable of an increased output of raw materials, tropical foodstuffs, etc. Of recent years, particularly, Belgium has taken a great interest in the development of her colonies; direct communication is established by Belgian steamship lines to the coast, and more recently by actual or proposed airlines right across the Sahara Desert.

### Part 3. HOLLAND, OR THE NETHERLANDS

The Kingdom of Holland, or the Netherlands, is a little larger than Belgium, from which it differs in several important respects. Holland has a long and varied coast-line along the North Sea, it is bounded on the east by Germany and on the south by Belgium. Thus Holland is not quite to the same extent a buffer state as is Belgium. The population of Holland is not far short of that of Belgium, but it is rather different in character. It is not always remembered that Holland falls naturally into two divisions, an eastern and a western.

The eastern part of Holland adjoins the plains of northern Germany and shares with some of their characters. There are considerable stretches of barren, sandy soil still covered with heath-lands or afforested with coniferous trees just as one finds in the northern plain of Germany. A limited amount of land only in this region can be cultivated and long ago the Dutch realised its limited capabilities. In order to find occupation for a population they deliberately formed there a number of small textile towns, concerned originally with the spinning and weaving of flax.

The western half or two-thirds is that part which is regarded as most characteristic of the country. In large measure it is actually the great delta of the river Rhine and the associated flat alluvial land. A large proportion lies actually below sea-level and has been reclaimed from the sea. The low-lying lands are surrounded by dykes and, in the olden days, drainage was effected by pumps operated by the wind and Holland became famous for the large number of its windmills. Of recent years these have been replaced in large measure by those electrically driven, and the windmills of Holland are rapidly disappearing, but the work of drainage goes on and the gigantic project at present in hand is to reclaim practically the whole of that large shallow sea the *Zuider Zee*. Part of it has already been reclaimed; a dyke has been built across its entrance, and the water in what is now an inland lake is thus controlled. Some parts of the drained polders, as they are called, have rich alluvial soil, and afford excellent land for cultivation; the more sandy portions are famous for their vegetable cultivation and their flowers (including bulbs), as well as a considerable variety of crops. But

the damper portions, associated with a heavier soil, are largely given over to grass, and it is on this that the Dutch rear their

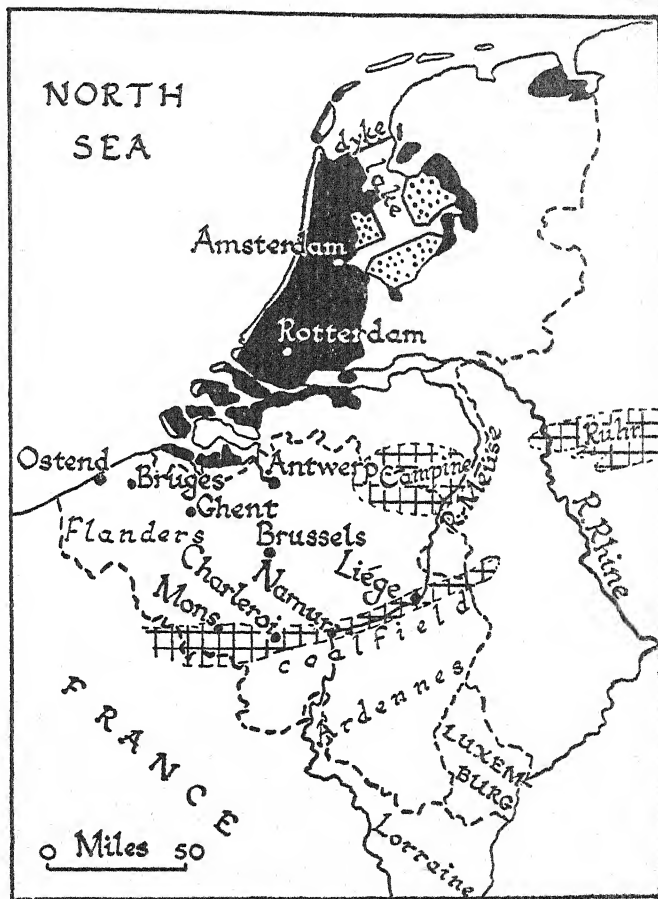


FIG. 201.—Belgium and Holland.

Land below sea-level in black. Land to be reclaimed from the old Zuider Zee, dotted.

famous dairy cattle. A large production of milk, butter and cheese results from this industry, together with rather more limited quantities of bacon.

Holland is fortunate in that in recent years has come the discovery of a coalfield in the south-east, that is part of the Campine coalfield, of which the other part lies in Belgium, and the production of coal has shot up so that it is now nearly half that of Belgium. Holland has long been a maritime power and at the present day it has a large and important merchant navy. Its two largest towns, Amsterdam and Rotterdam, are naturally ports, and they handle not only the extensive foreign trade of the country, but a very large transit trade from Germany. They lie, indeed, on the outlet of the rich Rhine valley, with the Ruhr industrial region. So important is this transit trade that one finds the same articles figuring in both the imports and the exports, but on the whole Holland imports raw materials and some foodstuffs, and exports foodstuffs and manufactures, including textiles.

#### Part 4. DUTCH POSSESSIONS OVERSEAS

The Dutch possessions overseas lie both in the East Indies and West Indies and include almost exclusively tropical and equatorial countries. In the West Indies the possessions include the small islands of Curaçao and Surinam, off the South American coast, and the important but largely undeveloped territory of Dutch Guiana which, with its neighbours British and French Guiana, has a production of cane sugar and rice. Dutch Guiana is a territory which could be made to yield much more.

Much more important are the Dutch East Indies, including the very fertile and densely populated island of Java, with its huge production of sugar, its considerable production of tea, rubber, palm oil, coffee and other agricultural produce, and its very important oilfields. The nearby island of Sumatra is considerably larger but has only recently shot ahead in its development, and is now becoming an important producer of palm oil and also has oilfields. Just off the coast of Sumatra are the two tiny islands of Banka and Billiton, which have a large output of tin ore. Then the Dutch East Indies include two-thirds of the very large island of Borneo, a tract still mainly covered with equatorial forest and capable of great development in the future, though Borneo is not believed to have the same rich soils as are found in the volcanic island of Java. The

Moluccas (Spice islands), Celebes and half of the island of Timor, and a large part of the great island of New Guinea also lie within the Dutch East Indies (see Fig. 140). The population of the whole must be well over 60 million. Java is particularly interesting as affording an example of an equatorial island, inhabited by a virile and active race, the Javanese, and where it has been found possible for the white, the Dutch, to settle and live permanently. The Dutch do this far more than the British or French; they make their home on the island and do not return on regular periods of leave or for retirement, as do the British from India.

The possession of these extremely rich West and East Indian islands has naturally been an inducement to Holland to maintain her merchant navy, and she has of recent years developed an important series of air communications with fine air liners running from Holland to the Far East. The Dutch Indies supply many of the raw materials for the home industries, and in the utilisation of both the mineral and vegetable oils there are close associations with British interests—the Royal Dutch Shell Company and Unilever, Limited, are associations of British and Dutch interests in the utilisation of mineral and vegetable oils and the manufacture of margarine, soap, etc. On the other hand, in tea and rubber, Dutch interests are often severe rivals of British interests. Some idea of the importance of the Dutch East Indies may be gained by saying that they produce a third of the world's rubber, a quarter of the world's tin, whilst next to Cuba and India, Java is the largest producer of cane sugar in the world; tobacco and copra (or coconut oil derived therefrom) are other leading exports. Naturally the demand of the Dutch East Indies is for manufactured goods, particularly textiles, but also a proportion of food, since the islands are so engaged in producing crops for export that they grow insufficient rice for the feeding of the people.

## CHAPTER XIX

### The Countries of Northern Europe

**General Considerations.**—Amongst the countries lying in northern Europe which we have not yet considered, there are three, Norway, Sweden and Denmark, which, although very different from one another, are usually grouped together as the Scandinavian countries, largely on the ground of the character of their population. They all three have direct outlets to the North Sea. Sweden has in addition a long coast-line along the Baltic and this links it with the Baltic Sea countries, the largest of which is Finland in the extreme north, the northernmost independent country in the world, whilst the others are the three new small Baltic states of Estonia, Latvia and Lithuania, and the important post-War country of Poland.

**Norway.**—Norway and Sweden share the great mountainous peninsula of Scandinavia. The mountain divide lies very much nearer the west coast than it does to the east; the land slopes eastwards from the divide towards the Baltic Sea in a series of steps. In general the boundary between Norway and Sweden follows the mountain divide, with the result that Norway consists of a very long, narrow strip lying between the high mountains and the very much indented North Sea coast together with the fringing islands; only towards the south does Norway become broader. In essence, then, the whole of Norway consists of the very steep western slopes of the high plateau. The deep arms of the sea with their rectangular bends are known as fiords; it is by no means uncommon for cliffs to go up 2,000 feet from the water's edge and the fiords themselves are correspondingly deep.

The amount of land available for human settlement is extremely limited; there are small tracts of flat land at the head of some of the fiords, or again there are ledges perched high up on the hillsides which can be utilised. Throughout history the

sea has played a very large part in the life of the inhabitants of Norway. They have been intrepid sailors and seamen, and they have been used to deriving a considerable proportion of their food, in the form of fish, from the sea. Familiar as they were with the sea and faced, as they were, with a shortage of land which could be used for settlement and cultivation at home, they have been driven forth over the sea as adventurers. In the early part of the first millennium A.D. the Vikings, Scandinavians, invaded many parts of the British Isles; long before Columbus had discovered America the Norwegians had crossed

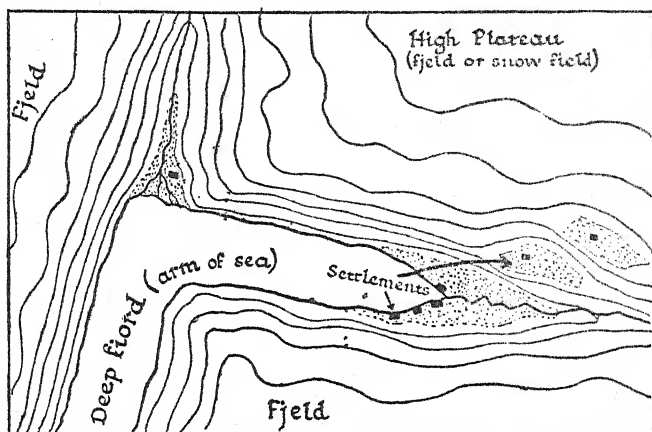


FIG. 202.—A Norwegian fjord settlement.

The contours are drawn at every two hundred feet. Notice the small area of flat land available for settlement, and the consequent use of slightly less steep parts of the hillsides. Cultivated or improved land is dotted.

the Atlantic and engaged regularly in fishing on the Grand Banks off the coast of Newfoundland. The consequence of having such a small area of land at home available for settlement is just as apparent to-day as the Norwegians have, for the size of their population, the largest merchant navy in the world; they do a great deal of work carrying for other nations. Many of them emigrate to other countries or venture far afield in their work, as, for example, whaling in the South Seas.

Less than 10 per cent. of the surface of Norway is suitable for cultivation, forests occupy a quarter, but a half can only



be described as waste land occupied by mountains. The leading products of Norway are well seen in the export trade. A third of all the exports is represented by wood-pulp, paper and, to a much smaller degree, timber, in other words, produce of the forest; one-third of all the exports is the produce of the fisheries—fish and fish preparations such as oil. Norway has no coal and very few minerals, but unlimited water-supply, so there has been considerable development in recent years in hydro-electric power. Cheap hydro-electric power has made possible the utilisation of hydro-electric furnaces with extremely high temperatures for the extraction of metals from refractory ores, *e.g.* aluminium from bauxite, and for such chemical processes as the use of the nitrogen from the atmosphere for the manufacture

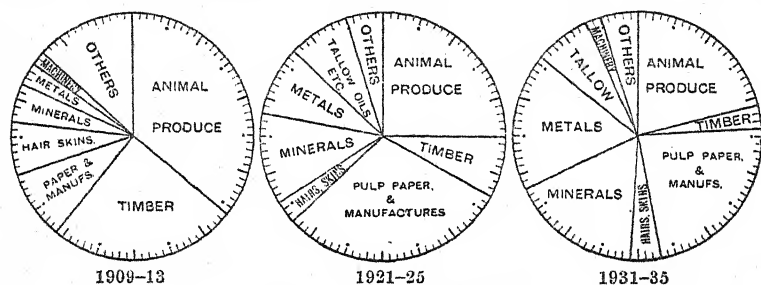


FIG. 203.—The exports of Norway.

of artificial nitrates as manures or fertilisers. The necessary capital has been poured into Norway from foreign sources, and to a large extent these manufacturing industries are in the hands of foreign companies. Norway has no overseas possessions if one excepts a tiny island in the South Seas used as a whaling base and the Arctic islands of Spitzbergen.

**Sweden.**—Sweden is much larger than Norway in that it occupies the much broader eastern slope of the Scandinavian peninsula. Further, Sweden extends farther south, and includes a considerable tract of cultivable, and comparatively flat, land in the south, which is really a portion of the great European plain. Thus we find the northern two-thirds of Sweden largely forested, and here the leading occupation of the people is lumbering. The timber is floated down the numerous streams to the

shores of the Baltic, along which one finds a succession of saw-mill towns. In the north of Sweden there are enormous deposits of iron ore, of great purity, great extent and great value. Unfortunately for Sweden the northern part of the Baltic is frozen for a considerable part of the year, and though there is a large export of the iron ore from the Baltic Sea ports, a considerable proportion is sent by railway across the divide to the ice-free Norwegian port of Narvik. The Swedish ores find a ready market in Germany, in Britain, in Belgium and in other iron and steel manufacturing countries. Thus whereas in Norway one-third of the country's produce represents the forests and one-third the fisheries, in Sweden one-third represents the forests and one-third the mines.

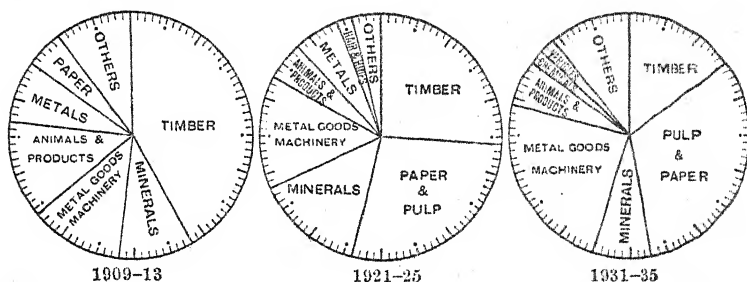


FIG. 204.—The exports of Sweden.

The southern portion of Sweden has also large forest areas, but the tracts of better land can be cultivated for the production of oats and other cereals for home use, whilst the large hay crop is used for the feeding of cattle. In the extreme south, Sweden has an important dairying industry.

It is not surprising to find that all the important cities of Norway are ports, the capital, Oslo, naturally situated where there is the largest tract in the hinterland for cultivation, the Glommen valley; Bergen, a great fishing port farther to the west, whilst a northern port of considerable size is Trondheim. On the other hand, Sweden has, it is true, its capital, Stockholm, as a great port, delightfully situated on a sheltered inlet a short distance from the Baltic, and another great port is Göteborg, on the North Sea coast, but in addition Sweden has inland

manufacturing towns including those famous for textiles, such as Norrköping.

**Denmark.**—Denmark consists of the peninsula of Jutland and a number of islands lying between that peninsula and Scandinavia and thus blocking, or guarding, the entrance to the Baltic Sea. The whole of Denmark is an offshoot of the



FIG. 205.—Denmark.

great European plain; it has an undulating rather than a flat surface, but no parts of Denmark rise more than a few hundred feet above sea-level. In books of about a hundred years ago one would frequently find Denmark described as the smallest and poorest country in Europe, a description which then might have been fairly near the truth. If one excepts certain clays and chalks for lime Denmark has no minerals, and the soils over large areas are poor, being beds of sand or sandy clays left behind by the great ice-sheet. Much of the surface of the

country was formerly covered with heathland. But the Danes have worked exceedingly hard, and they have organised themselves exceedingly well; they have reclaimed the land from the heath and it is under cultivation, the object of which is to provide feed crops for animals, particularly for dairy cattle and for pigs. Denmark has deliberately concentrated on dairying, and the great success that has attended her efforts has depended not only on the industry of the people and the intensive cultivation of what is naturally a poor soil, but also very largely on the organisation of the whole industry on a nation-wide co-operative system. The State maintains stringent standards for the commodities exported. Thus Danish bacon, though not to be regarded as the best in the world, is extremely reliable, and its quality varies but very slightly.

Denmark remains, in the main, an agricultural country. With an area roughly twice the size of Wales it has a population still under four million, a population which is progressive and prosperous and with a high appreciation of culture, as one may realise from the beautiful capital, Copenhagen. The lack of coal has led to the recent interesting import of electric power from Sweden, the narrowness of the waterway between Denmark and Sweden making this possible.

Communications have been difficult and train ferries have been utilised to link up the railways; thus it is possible to go from Copenhagen to Berlin by night express through train ferries without moving from one compartment, but the disadvantages of these systems are obvious, and at the present time Denmark is busily engaged in linking up her railways by huge bridges across the narrower stretches of water.

Reference has already been made to the very important foreign trade—butter, bacon, eggs and cattle as the leading exports—and it is interesting to notice that three-quarters of all the exports are represented by dairy products, and well over half all these dairying exports go to the United Kingdom, with Germany second from the point of view of exports. It is interesting to notice, however, that a larger proportion of imports come from Germany.

The Faroe or Sheep islands belong to Denmark as well as the greater part of the plateau of Greenland. Iceland is an independent kingdom which shares its king with Denmark.

**Finland.**—Finland, called *Suomi* by its own people, is remarkable for its situation so far to the north. The southernmost point of the country lies north of the northernmost point of the mainland of Great Britain, and from there it stretches away to the Arctic Ocean, bordering Norway and Sweden on the one



FIG. 206.—Finland.

hand, Russia on the other. Under the old Russian Empire, Finland was an independent or semi-independent Duchy. It achieved autonomy after the Great War and was established as a republic.

The greater part of Finland consists of a low plateau of ancient metamorphic rock, whose surface has been profoundly modified by the conditions of the great Ice Age. The ice-sheet which covered the country scooped out hollows now occupied by lakes, so that Finland is not infrequently described as "the country of ten thousand lakes." Around the coast, on the west and the south, where the waters from these lakes escape to the lower ground along the sea-coast, water-power is available, particularly in the south, whereas in the

west there are considerable stretches of sandy land. It is only in the north—on the divide before one approaches the Arctic Ocean—that the surface of Finland rises more than a few hundred feet above sea-level.

Climatically Finland is more favoured than is commonly

believed. The Arctic shore is open throughout the year, although only a very tiny strip of coast-line belongs to Finland. The other shores are blocked by ice except in the extreme south-west corner, where the port of Hango is kept open throughout the year. The summers are mild, one might even say warm, and the cultivation of barley, oats and hay crops can be carried on throughout the country even to well within the Arctic Circle. But more than three-quarters of Finland is forest covered, the amount of land having soil sufficiently good for cultivation even for hay crops is limited. But the forests form the great source of wealth of the country, and there is a great production of timber and such timber produce as plywood, pulp and paper. It is significant of the importance of the little clearings that dairying should have been so developed that there is an export of butter.

Many misconceptions exist with regard to the Finns, as the principal people of the country are called. Through the impingement of civilisation across the Baltic a number of the Finns are Swedish speaking, but the bulk are Finnish speaking. They are a fine stalwart race of people, usually blonde, mentally and physically active, and with a high standard of culture and living which tends to surprise the casual visitor. The beautiful capital of Helsingfors—to use the Swedish name, Helsinki to use the Finnish—shows the relative importance of Swedish, Russian and Lutheran or German influences, but it is marked by numerous attractive modern buildings, which exemplify the reality of modern Finnish art and architecture. Towards the extreme north and occupying also part of Norway and Sweden, is the territory loosely called Lapland, because it is inhabited by that dwarf race of people, the Lapps. It is extremely important not to confuse the Lapps with the Finns.

**The Baltic States.**—Along the east coast of the Baltic Sea south of the Gulf of Finland are the three small republics which became independent after the Great War.

*Estonia* has really been a buffer state between Sweden and Russia. In its physical features it is part of the great Russian plain, and agriculture and dairy farming are the chief occupations of the million people that inhabit its 18,000 square miles. Tallinn, or Reval, is its chief town.

The *Latvian Republic* is larger than Estonia and is about the

same size as the Irish Free State and the population of Latvia reaches about two million. Again, it is mainly an agricultural country with those crops which characterise the northern part of the great Russian plain such as oats and rye, with smaller quantities of barley, potatoes and flax. But the forests which cover parts of the country give timber for export. The output of flax is very important, and it is indeed the leading export in most years, though butter is also significant. The capital, Riga, an important town, at the head of the Gulf of Riga, was once a leading outlet for much of Russia; it is really the frontier town between Western Europe and Russia, in that it is here that the railways change from the standard gauge of western Europe to the broad gauge of Russia.

*Lithuania* lies to the south of Latvia and agrees with it in its general characteristics and in its produce. The Lithuanians claim Vilna as their capital, but this town is at present in Poland and the seat of the government is at Kovno, or Kaunas. After the Great War Lithuania was allotted a tiny strip of coast only, but seized what is the natural outlet of the country, the port of Memel.

**Poland.**—The famous old kingdom of Poland again became independent as a republic after the Great War, being carved partly out of Germany, partly out of Russia, and partly out of the old empire of Austria-Hungary. It lies for the most part in the great European plain, but stretches from the Baltic Sea to the Carpathian Mountains. It has the disadvantage, except perhaps in the south, of possessing no natural frontiers. True, along the border with Germany, on the west, there are extensive marshes, and so also are there on the frontier with Russia on the east.

The importance and size of Poland are not always realised. It is, for example, larger than the whole British Isles and has a population nearly as large as that of England. As one might expect from a country with few or no natural boundaries, population difficulties arise. Although 50 per cent. of the people of Poland are Poles, on the eastern borders there are areas with a close intermixture of Russians and Poles with numerous Jews, whilst the frontier of Germany and Poland through the Silesian coalfield presented the utmost difficulty, for the towns were largely German and the rural districts

Polish. The larger part of Poland lies in the basin of the great Vistula river, which is connected by canals or waterways with the Russian rivers on the one hand, and with the German rivers on the other. Near the mouth of the river is the natural outlet of the country, the great port of Danzig, but owing to its population, so largely German or of other nationalities, Danzig



FIG. 207.—Poland.

was set up as an independent city under the control of the League of Nations after the Peace Settlement. Poland was given an outlet to the Baltic Sea and has now built her own port of Gdynia. This "Polish corridor" reaching the sea unfortunately cuts off a portion of Germany, namely Eastern Prussia or Pomerania, from the main part of the country, and is regarded as constituting a difficult problem not yet solved.



Geographically Poland can be divided into three very unequal parts. The bulk of the country, or northern Poland, is essentially agricultural, and resembles in general character the North German Plain, with large forested areas, extensive districts occupied by useless marshes which may one day be drained, the remainder largely under cultivation with rye and oats as the leading crops. Considerable quantities of sugar-beet are grown and also flax, whilst there are large numbers of cattle and huge numbers of pigs. The centre of the region is the capital, Warsaw. The northern part of the plain is characterized by a very large number of lakes. To the west of the Polish plain, on the borders of Germany, are the Poznan or Posen marshes. Along the

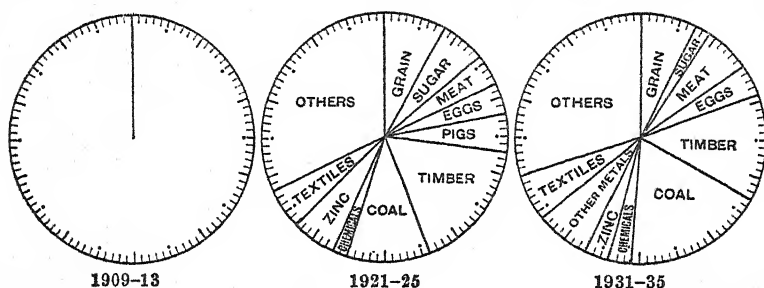


FIG. 208.—The exports of Poland.

Russian border are the much more extensive Pripyet marshes in part reclaimed as hay and grazing land but still including some of the least accessible regions in Europe.

The southern half of Poland consists mainly of a low plateau covered with a fertile loess soil. In this area Lodz, noted for its manufacturing industries, particularly textiles, should be noted and also the other urban centre of Lublin. Between the low plateau and the forest-clad slopes of the Carpathians is a broad valley which has long served as a routeway. Lwow (Lvov or Lemberg) guards the eastern end, Cracow its western end. Poland's rich oilfields lie in the sub-Carpathian belt (especially at Boryslaw, near Lwow) and the famous salt mines near Cracow are said to be inexhaustible.

Polish Silesia or the Polish Silesian coalfield constitutes the third region, a very small but extremely important one.

Two-thirds of this, probably the richest coalfield in Europe, now lie within the boundaries of Poland, which has thus an annual output of coal approximating to 30 million tons, considerably larger than the total output of the important little manufacturing country of Belgium, and equivalent to some three-fifths of the normal output of France. In October, 1938, Poland entered into possession of an additional tract, around Teschen, which from 1918 to 1938 had formed part of Czecho-Slovakia although inhabited largely by Poles. Though in some respects the coalfield is badly situated in distance from the sea, it is very conveniently situated for the export of the coal to the neighbouring countries of Central Europe by rail, and much Polish coal finds its way to the countries of Central Europe, a considerable proportion to Italy, partly however by sea.

The resources of the country are well shown by the exports. The two leading items are timber and coal, followed by dairy produce, pigs, eggs, bacon and agricultural produce such as sugar, whereas an important subsidiary mining industry is shown by the export of zinc, as well as of mineral oil.

## CHAPTER XX

### The Countries of Southern Europe

**General Considerations.**—Southern Europe consists essentially of three peninsulas, which jut out southwards from the main mass of the continent. The first, the westernmost one, is the peninsula of Iberia, occupied by the countries of Spain and Portugal; the second is the narrower peninsula of Italy, which we have already considered; and the third, the eastern one, is that known as the Balkan Peninsula. Of the countries which share the land of the Balkan peninsula, Greece is essentially Mediterranean, Yugoslavia is partly Balkan and partly Central European in character, whilst Bulgaria is also a transitional area. Only a tiny fragment of the Balkan Peninsula remains in the possession of Turkey. These three peninsulas have in common the fact that they share a Mediterranean climate. The climatic conditions vary considerably in detail from one part to another, but they all have those hot and comparatively rainless summers and mild but rainy winters.

#### Part 1. SPAIN AND PORTUGAL

**Position and Size.**—The peninsula of Iberia, which comprises the republic of Spain, the republic of Portugal and the tiny British possession of Gibraltar, has an area twice the size of the whole of the British Isles, though Portugal, which occupies a compact rectangular block in the west, is only a little larger than Scotland. Lying as it does between the latitudes of  $36^{\circ}$  and  $44^{\circ}$  N., practically the whole is in Mediterranean latitudes. Spain shares with France the advantage of having a long coastline along the Atlantic as well as along the Mediterranean, but on the other hand is cut off from the remainder of Europe by the great mountain barrier of the Pyrenees.

**Physical Features.**—The whole peninsula consists of a great plateau, usually known as the Meseta, for the most part between

2,000 and 3,000 feet above sea-level. The plateau is bounded on the north by groups of mountains, notably the Cantabrians, and on the south by the Sierra Morena, but its surface is by no means flat. Across the centre runs the central dividing system. In the north-east, between the plateau and the Pyrenees, there is the broad trough of the Ebro valley, whilst in the south of the peninsula the plateau proper is separated from the lofty

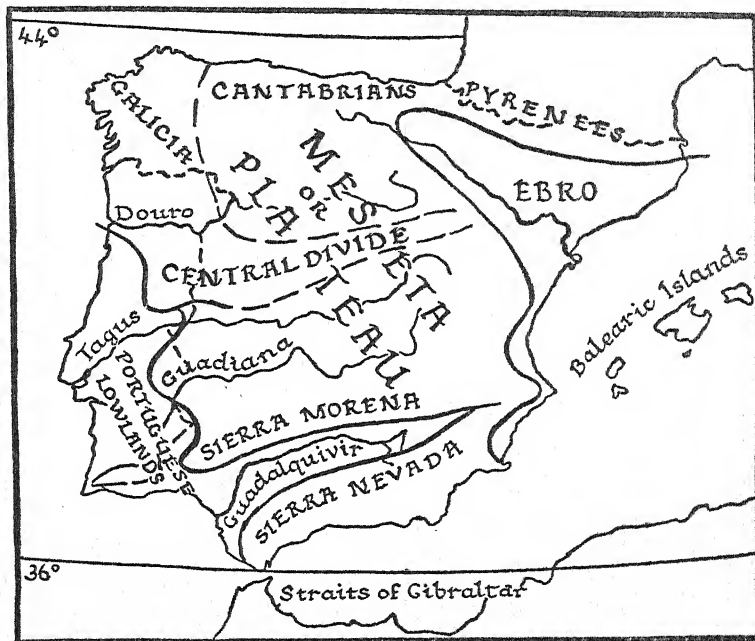


FIG. 209.—Physical map of Spain and Portugal.

Sierra Nevada by the broad and important valley of the Guadalquivir. It should be noticed that, with the exception of the Ebro, the rivers which drain this plateau drain towards the Atlantic Ocean. The broad lower courses of the Tagus and the Guadiana provide much of the fertile land of Portugal, and the narrow-terraced valley of the Douro is the famous port-wine country.

**Structure and Minerals.**—For the most part the plateau

is built up of ancient metamorphic rocks, in places highly mineralised, so that as a whole the peninsula is rich in minerals. Metallic minerals, particularly those of copper, lead and zinc, and to a less extent iron, are important in the southern provinces of Spain. The northern fringe of the plateau amongst the Cantabrians has important coalfields, those of Oviedo in particular, as well as large reserves of iron ore. It is significant of the present state of development of the peninsula that the metallic products as well as the coal and the iron ore are produced mainly for export. Portugal is less fortunate than Spain in that although it has the same wealth of metallic minerals it lacks the coal wherewith to facilitate their exploitation.

**Climate.**—The peninsula is sometimes divided roughly into two, the northern and western portions having a comparatively good rainfall, and hence known as pluviose Spain, whereas the central, southern and eastern portions are deficient in rainfall and are called arid Spain. A better division is one which correlates with the physical features and which is shown in Fig. 210.

(a) *Northern Spain* shares with the neighbouring parts of France the type of climate known as North-West European, for though the bulk of the rainfall does, it is true, fall in winter, the summers are by no means rainless, and summer heat is definitely tempered by the influence of the Atlantic Ocean. Thus this part of Spain is forested with deciduous trees, and in the valleys of the north-east one finds rich grasslands supporting the dairying industry and thus inviting comparisons with Brittany in France or Devon and Cornwall in the British Isles.

(b) *The Plateau or Meseta* has a modified Mediterranean climate. Its winters are cold owing to elevation, its summers hot, largely owing to the low rainfall. On the whole the northern part of the Meseta, north of the Central Divide, is more closely connected with the North-West European climatic type; the southern part, south of the Divide, is more definitely Mediterranean in character. But the northern part is too cold in winter for the olive and other Mediterranean fruits, and parts of the south are too arid. Conditions on the more fertile soils are ideal for the cultivation of large stretches of wheat. The southern part of the Meseta is too dry for cultivation and is largely occupied by poor grasslands which furnish indifferent

pastures; only in the more favoured tracts can rather stunted Mediterranean fruits, including the olive, be cultivated.

(c) *The Mediterranean Coastland* is a long narrow strip consisting of tracts of cultivated plain, owing their cultivation largely to irrigation, separated by arid hills. Here the cultivated tracts include "huertas" or "gardens," which normally have two crops a year, and "vegas" which are devoted to fruit trees

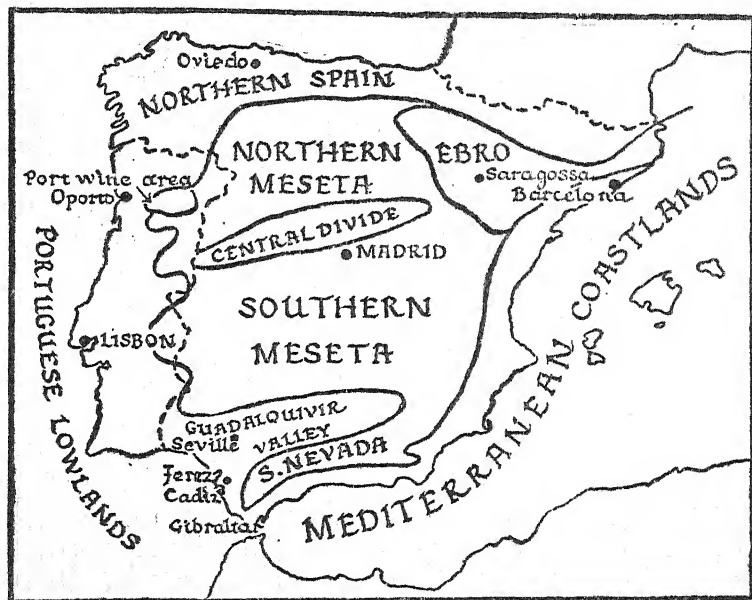


FIG. 210.—The climatic divisions of Spain and Portugal.

and have only one crop. But this is essentially the area producing Mediterranean crops, the vine and the olive, while some strips are hot enough and dry enough to produce dates—the only region in Europe which does—whilst other areas grow a little rice. Rather different in character is the *Guadalquivir Valley*, which, since it opens to the Atlantic, is moister and rather milder: it is a warm sheltered region where Mediterranean fruits flourish and where large areas are occupied by vineyards. Here is Jerez, radically associated with "sherry," the

name of the wine being actually a corruption of the name of the town, and Seville, which is associated with oranges. In the north of Spain the *Ebro Valley* is cooler, but irrigated and largely cultivated, and in many ways is isolated from the remainder of Spain. The heart of the valley groups itself around Saragossa, but the focus of the lower part is the great manufacturing town and port of Barcelona. The Ebro valley, or Catalonia, is so different in character from the remainder of Spain that on many occasions it has tried to secure provincial or actual autonomy.

(d) *The Portuguese Lowlands* enjoy a modified Mediterranean climate with, in the north, a certain amount of rainfall in the summer, but the climate of the whole region is tempered to some extent by the influence of the ocean. Mountain spurs from the great plateau penetrate westwards into Portugal, but the lowlands are the most important part. The north is linked with Spanish Galicia; farther south the Douro valley outlet, Oporto, ships the famous port wines from higher up the valley. The ridges are covered with cork-oak forests, and farther south the country is drier but is noted for mining.

Much interest attaches to the people of Spain and Portugal. Both countries are now somewhat thinly populated, Spain with a population of 22 million and Portugal with a population of rather under seven million. The dry heart of the peninsula is not conducive to close settlement, and the only large town is Madrid, the capital, situated geometrically almost in the centre of the peninsula. Of the remaining eleven towns with a population of more than 100,000, the two chief in Portugal, the capital Lisbon and Oporto, are both ports, and so are seven of those of Spain. In the Middle Ages the peninsula was invaded from the south across the Straits of Gibraltar by Moors and by peoples of partly negro origin. They have left their mark on the country in many of the buildings in the towns of the south, and most Spaniards have Moorish blood in their veins. Many Portuguese have likewise Moorish blood and a trace of negro blood also. Both Spain and Portugal have been in the past the centres of enormous world empires. The whole of the continent of South America and Central America were originally opened up by the Spanish and the Portuguese; Spain and Portugal have bequeathed to these countries their languages and their ruling

classes in each case, but the countries themselves have become independent. To-day Spain has left to her control only certain unimportant territories in Africa and an influence over the northern part of Morocco. Portugal has retained more extensive tracts, including Angola and Portuguese East Africa, but in each case tracts which are comparatively undeveloped. What is the explanation of the fall of the great empires? Some would hold that it is the result of the Mediterranean type of climate in the home country, others that it was the dissipation of energy on the colonial enterprises. But there are clearly signs of resuscitation of former greatness, notably in Portugal. At present in the main an agricultural country (in which industry 90 per cent. of its people are employed), Spain is commencing to develop modern manufactures, especially in the progressive north-east around Barcelona. At present the exports of both Spain and Portugal are food products and raw materials—fruits and wine and olive oil, metallic ores in the case of Spain, but an increasing quantity of manufactures, including cotton goods, whilst the exports of Portugal are certainly in the first place wine, and in the second place the produce of her important fisheries.

**Overseas Possessions of Spain.**—The Canary Islands, with their genial climate and production of bananas, are administratively part of Spain proper. The considerable territory of Rio de Oro is mainly part of the Sahara Desert; its present significance is that it lies on the routes of the trans-Atlantic air services to South America. The small island of Fernando Po was once the leading producer of cocoa, but the centre of production has passed to the British Colonies on the West Coast mainland.

**The Overseas Possessions of Portugal.**—These include the Cape Verde islands and the favourite resort of Madeira, the latter an administrative part of Portugal proper, Portuguese Guinea similar in character to British West Africa, the islands of St. Thomas and Principe, famed for their cocoa and other equatorial produce, the large territory of Angola, which is said to be to a large degree fertile grazing country, and which is likely to be opened up as a result of the construction of the Lobito Bay railway by British interests right across the colony to the Belgian territory of the Katanga. Portuguese East



Africa has the important ports of Beira and Lourenço Marques, which serve as outlets for Rhodesia and part of the Transvaal respectively. But of the once extensive Portuguese possessions in India there remains only Goa, the only good harbour south

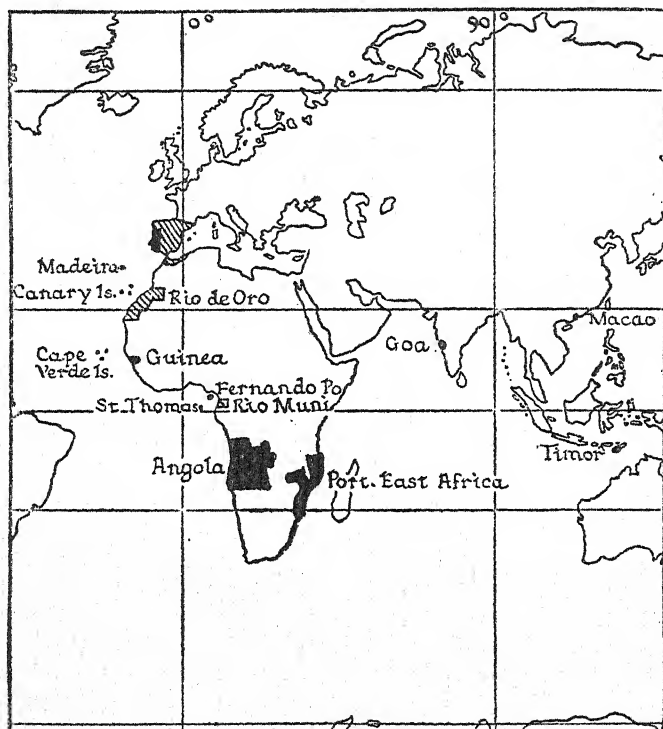


FIG. 211.—The Spanish and Portuguese overseas possessions.

of Bombay, on the west coast. In Macao the Portuguese have a potential rival to Hongkong, being situated on an island at the mouth of the Canton river to the west of the island of Canton. In the East Indies the Portuguese possess half of the island of Timor, the other half belonging to Holland.

## Part 2. THE BALKAN PENINSULA

Unlike the Iberian and Italian peninsulas, the Balkan peninsula is very broad in the north and it is very difficult to say where the peninsula begins and the mainland ends. The outstanding feature of the peninsula is its mountainous character and the way in which the irregular ranges and groups of mountains have tended to isolate the fertile coastal strips and valleys. Thus from the days of the early Greeks onwards settlement has been concentrated on or near the coast in the heart of the more fertile patches and, in the early days, each of the valleys developed as a city state grouped round its own particular city. The interior consisted largely of wild and undeveloped country, and in some areas, particularly in Albania, on the western side of the peninsula, now under Italian influence, old tribal customs persist right to the present day. The country which now occupies the whole of the south of the peninsula and many of the neighbouring islands is Greece, part of the western coastal region belongs to Albania; the remainder of the Adriatic coast forms part of the country of Yugoslavia, whilst in the north-east of the peninsula is Bulgaria. The coastal regions of the whole peninsula enjoy what is described as an eastern Mediterranean type of climate, with the typical hot, dry summers and the typical moist, wet winters. The eastern Mediterranean differs from the western in the greater extremes, in the greater heat in summer and the often intense cold in winter. The mountainous heart of the peninsula resembles climatically rather more the Central European type of climate in the prevalence of winter cold and snow.

**Greece.**—Greece is almost exactly the same size as England, but has only one-sixth of the population. The country is so mountainous that only one-fifth can be cultivated; most of the mountains are dry, limestone ridges often nearly bare, though forests cover them where conditions are better. The rainfall is low so that there is little water available for irrigation, and thus most of the settlement is in the coastal tracts of alluvium. Wheat, barley and maize are grown for home consumption, and Greece is famous for its grapes. The small dried grapes known as currants are the staple export together with tobacco, and the currants come almost exclusively from the

neighbourhood of Patras and Corinth. But other Mediterranean fruits are important for local use—olives, figs, oranges and lemons. The situation of the famous city of Athens with its modern port of Piræus close by should be noticed, and the remarkable recent growth of Athens to nearly a million in population is largely a result of the expulsion of the Greeks from Asia Minor and from Turkey. Farther north the port of Salonika is rather the outlet for the Yugoslav territories to the north than it is of Greece properly speaking.

**Albania.**—The little kingdom of Albania is extraordinarily interesting because it is a very rugged, backward territory, about 50 per cent. larger than Wales, and it lies to the north-west of Greece. Until recently it had no roads, no railways, no coinage and no banks. It was occupied by tribesmen under their hereditary chieftains; each Albanian family lived its own self-contained life, producing the essential requirements of life. Rapid changes have now taken place under Italian influence.

**Bulgaria.**—Bulgaria is a small and mountainous kingdom, almost as large as England but with a population of just about one-sixth or one-seventh of that of England. It is transitional in character between the Balkans and Central Europe. It comprises in the north a part of the valley of the river Danube, in the centre a broad mass of the Balkan Mountains and the Rhodope Mountains, and in the south the valley of the Maritsa. There are extensive plains of wheat and maize and, where more sheltered, vineyards, tobacco and sugar-beet plantations or orchards with plums and peaches. Sofia, the capital, is the principal town. Notice that Bulgaria has important outlets on the shores of the Black Sea; they are both commercial ports and seaside resorts, and have increased in significance in recent years.

## CHAPTER XXI

### The Countries of Central Europe

**General Considerations.**—It is essential to be thoroughly familiar with the physical map of Europe. It will be seen that lying between the Mediterranean peninsulas on the south on the one hand and the Great European Plain and its borderlands on the north, there is a wedge of country, broad in the east and tapering to the west, which consists essentially of great mountain chains surrounding and enclosing plateaus and plains. For the purpose of this book we will regard this area as Central Europe. The main knot of mountains at the western end, the Alps, has long been occupied by the curious little independent republic of Switzerland, but before the War the greater part of the remainder had come under the dominion of the German-speaking Austrians in their alliance with the Hungarians in the Austro-Hungarian Empire. This great empire had pushed its influence southwards so as to include almost the whole of the Adriatic Sea coast and extended almost into the Balkan peninsula. To the north it had extended its influence to the borders of Germany and Russia; it had brought under its dominion two interesting groups of people, very different from the controlling Austrians and Hungarians. These were Slav peoples from the south, the southern Slavs, who are allied of course to the Russians, and in the north a group of northern Slavs, who inhabited the country of the plateaus and the Carpathian Mountains. The break-up of the Austro-Hungarian Empire as the result of the Great War was the opportunity for these groups of peoples to achieve their long-cherished national ambitions. The old German-speaking region of Austria became independent; Hungary, unduly diminished in size, became an independent unit in the heart of the Hungarian plain; the southern Slavs banded themselves together and formed the Kingdom of Yugoslavia. In the north the north Slavs, led by the Czechs of Bohemia and the Slovaks

of the Carpathian valleys, united themselves into the country of Czecho-Slovakia, whilst a considerable slice of the old Austro-Hungarian Empire was added to the already existing country of Rumania, and another part to the new republic of Poland.

Climatically the whole of this belt may be described as having a Central European type of climate, one which is marked by cold winters, comparatively warm summers—hot in the south—



FIG. 212.—The countries of Central Europe.

By comparing this map with the next, the relationship of the countries to the mountain belt can be seen.

and where the bulk of the rain comes in the spring and early summer but is distributed throughout the year. The continentality of the conditions (*i.e.* the contrast between the heat of summer and the cold of winter) is accentuated in such areas as the Hungarian Plain, which are low-lying but are cut off from maritime influences by the surrounding mountains. Topography and climate have their effect on vegetation, and there is the contrast between the forested mountains with their high

alpine pastures and their fertile cultivated lower valleys, and the broad open, treeless stretches of the enclosed plains of which that of Hungary is the most typical.

We will now consider the countries which lie in Central Europe, taking them in order from west to east.

**Switzerland.**—Switzerland is in very many ways a remarkable

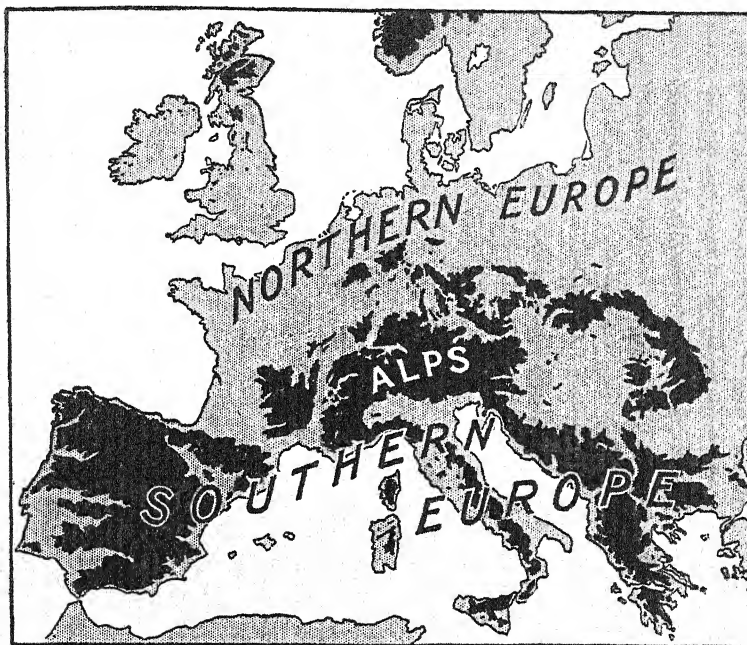


FIG. 213.—Central Europe, showing in black the mountain belt which lies between the countries of Northern Europe and the countries of the Mediterranean.

country. Its position in the heart of Europe is significant with a frontier against Germany, France, Italy and Austria ; it has nevertheless maintained a unity and a neutrality throughout a long period of troubled European history. This little country is only about half the size of Scotland and has a population of only about four million.

In its physical features, Switzerland is divisible into three

parts. The southern half forms part of the main chain of the Alps, and is extremely mountainous. In the north is a small strip of the Jura Mountains, whilst between the two lies the Swiss Plateau, where most of the cultivated land is found and where the bulk of the people live.

Structurally the mountains of Switzerland are young, folded mountains of the Alpine series and they are not rich in minerals; nor has Switzerland any coalfields, but it makes up for these disadvantages by the abundance of water-power. So, with little coal and little iron, Switzerland has become pre-eminently a manufacturing country with raw materials and foodstuffs forming the bulk of its imports, and manufactured goods the bulk of its exports. Switzerland makes excellent use of its



FIG. 214.—Central Europe, before and after the Great War.

The map on the right shows the boundaries as they were from 1919 to 1938 before the adjustment of frontiers.

climatic conditions. The higher mountains are always snow-capped, but in winter snow covers a large part of the lower ground for long periods at a time, and the Swiss have been wise in developing winter sports. Hotel-keeping and the attendant trades form a lucrative occupation for a large proportion of the population. In the winter the snow covers the high alpine pastures and the dairy cattle are driven down from these to the lower parts of the valleys where they are stall-fed throughout the winter months. Probably it is this variation in feeding which gives such excellent qualities to the milk for which Switzerland is justly famed. On the other hand, the climatic conditions of Switzerland in summer are almost equally attractive; a comparatively low rainfall and blue skies render the mountain scenery an enticement to thousands upon thousands of tourists annually.

Referring to the people of Switzerland and their distribution, it is interesting to note that the country is tri-lingual; to the south Italian is spoken, in the west French, whilst in a large proportion of the north and east of the country German is the language. Despite these linguistic difficulties the country has remained a unit.

The situation and mountainous character of Switzerland have necessitated the concentration of manufacturing activities on articles of small size requiring a limited amount of raw material, but which require the expenditure of much labour. So amongst textiles, it is fine silk materials, or especially fine cotton goods, which are typical. In other manufactures Switzerland is celebrated for its watches and clocks as well as for jewellery, whilst the importance of Switzerland in the manufacture of electrical machinery is very marked because of the water-power available for conversion to hydro-electric power, and again of the skill which is required in the manufacture of such machinery. In the export and import trade the ports utilised by Switzerland are either those of the north—Antwerp, Rotterdam, Havre—or those to the south—Marseilles and Genoa; but a large proportion of the trade is not sea-borne, but is with the neighbours of Switzerland, Germany, France and Italy. It is largely because of the stable history of the country, but particularly because of its situation in the heart of Europe, well served by many routes, that Switzerland has been made the headquarters of the League of Nations (at Geneva). Two important railway routes pass respectively through the Simplon and the St. Gotthard tunnels and connect Switzerland with her southern neighbour, Italy, while the Mont Cenis tunnel makes possible direct communication between France and Italy.

**Austria.**—Austria was a republic from 1918 to 1938, when it was absorbed in the German Reich. In many ways there is a close comparison between Austria and Switzerland. It is rather larger and has a 50 per cent. larger population, but it shares with Switzerland the distinction of being entirely a mountainous country. Again, a three-fold division is possible into the eastern part, almost essentially the Alps, covering three-quarters of the whole, then the valley of the Danube, the most important part of the country and the most densely populated, and where is situated



the great capital city of Vienna, and in the third place the hills to the north of the Danube.



FIG. 214a.—The boundaries of Czecho-Slovakia before and after the frontier adjustments of 1938.

The relationship of the new frontier to the main railways and to the coalfields should be specially noted.

**Hungary.**—In most respects Hungary is the exact reverse of Austria. It is a little larger and has a few more people, but whereas Austria is almost entirely mountainous, Hungary is almost entirely a plain. Indeed, it occupies only the centre of the Hungarian Plain; it is divided into eastern and western halves by the broad course of the navigable Danube, while it is divided into a larger south-eastern portion and a smaller north-western by a low ridge of hills. Where these hills cross the Danube the valley is narrower, and one finds here the twin city of Buda-Pest, one built on one side of the Danube and one on the other—the two connected by bridges and forming the capital of the country.

The people of Hungary are distinct. They are Hungarians or Magyars, frequently called gipsies, and who are allied to the Turks and other Asiatic races, rather than with their European neighbours. For nearly a thousand years the heart of the

plain has been an independent kingdom. The rolling grasslands of the Hungarian Plain have almost disappeared, giving place to cultivated crops. To the north there is the unending sea of rye, oats, and barley; in the richer land to the south, wheat and maize become the chief crops. Sugar-beet and hemp and flax are also grown, and cattle are kept in large numbers and fed upon fodder or corn. Also there are considerable numbers of sheep and large numbers of pigs. The north shore of the large Lake Balaton is a wine producing area, but it is in the north-east of Hungary that a specially sheltered local area of particular soil characters makes possible the growing of the vine for the famous Tokay wine. The exports of Hungary were essentially agricultural products or those which are made directly therefrom, such as flour, sugar or distilled liquors, but in the last few years there has been a marked increase in manufactures, notably of electrical apparatus, at Budapest.

Hungary possesses a little coal and also deposits of lignite, but it has no other minerals.

For the agricultural produce of Hungary there is a ready demand from her manufacturing neighbours, and so a third of all the exports go to Austria and a fifth to Czecho-Slovakia, thus illustrating the complementary nature of the Hungary of the plain and the Austria of the mountains and the Czecho-Slovakia of the northern hills. These countries in return send those manufactured goods, such as clothing and textiles, which the people require for their everyday life.

**Czecho-Slovakia.**—is another country which arose after the Great War, and is a union of the northern Slav peoples. It consists of three rather distinct parts: there is the plateau of Bohemia, better known now as the Czech plateau, through which flows the upper course of the Elbe, making its way through a gorge into Germany and giving Czecho-Slovakia a navigable outlet to the North Sea. On a tributary of this river stands Prague (Praha), the large and prosperous capital of the country. The plateau has rich coalfields of good coal but the lignite in the surrounding mountains is now in Germany. The broad valley plains on the surface of the plateau can be cultivated and many of them have good soil; potatoes, rye and wheat are grown here, hops for the brewing of the famous Pilsener beer, and large quantities of sugar-beet for the production of sugar. As a result of the availability of coal and of metals manufacturing industries have sprung up; glass and chemical

factories are particularly important, with paper-mills and sawmills near the forests of the surrounding mountains. This part of Czecho-Slovakia is a developed, modern area with numerous manufactures.

The second part of Czecho-Slovakia is the central portion, a broad valley known as the Moravian lowland, which has much good agricultural land and is rather similar in character to the neighbouring Hungarian Plain: indeed, this region is closely linked with the Hungarian Plain in that it has a port on the Danube, Bratislava, only a short distance from Vienna. At the northern end of the Moravian Lowland is a small portion

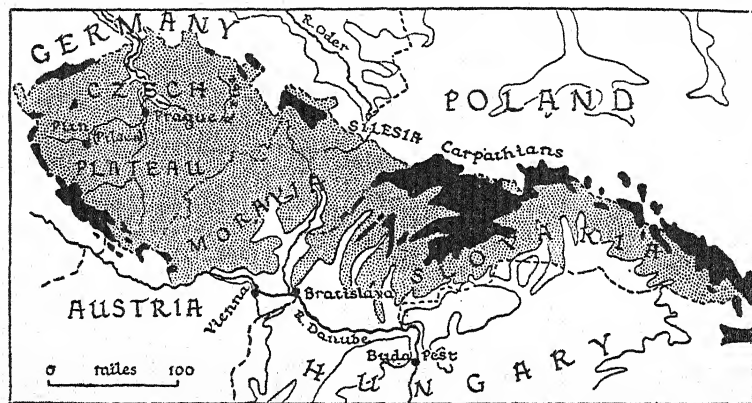


FIG. 215.—Czecho-Slovakia—pre-1938 boundaries.

Land over 3,000 feet above sea-level, black; land between 600 feet and 3,000 feet (within the borders of Czecho-Slovakia only) dotted. Notice the "tongues" of the Hungarian plain penetrating the mountains of Slovakia.

of the Upper Silesian coalfield, which lies within the borders of Czecho-Slovakia, and this has given rise to the Czecho-Slovak "Black Country," with an iron and steel industry.

The eastern third of the country is occupied by the Carpathian Mountains and the valleys along their southern slopes. There are valuable forests, but the mountain valleys are curiously isolated, and this region, by comparison with the rest of the country, is undeveloped and isolated, and the Slovaks who inhabit it are less progressive than the Czechs.

Czecho-Slovakia, like Switzerland, is a country entirely surrounded by land and its trade therefore passes through the

territory of its neighbours. Yet curiously enough it is in the main a manufacturing country, with imports of raw materials such as raw cotton and wool, together with cereals, the whole making up more than a half of the total imports. The exports are manufactures, particularly of cotton, wool, iron and glass ware, or manufactures prepared from the home-produced raw materials, such as sugar and beer.

Yugoslavia, the union of the southern Slavs, is far too often confused with Czecho-Slovakia. It was formed after the Great War from the union of the old kingdoms of Serbia and Montenegro, together with large sections of the old Austro-Hungarian



FIG. 216.—The railways of Czechoslovakia.

Empire, Bosnia and Herzegovina, and land stretching along the Adriatic coast as far north as the Alps in Slovenia.

The country is comparable in size with England, Wales and Scotland and has a third of the population. It has become united as a kingdom under the former King of Serbia, and despite great differences in the racial character and religion of the people—and to some extent in language—it has progressed as a unit.

It broadly comprises the following parts :

(a) In the north, a small piece of the Alps, lying in *Slovenia*, where the country is similar in character to that of its neighbour Austria.

(b) The *Adriatic Coast*, Dalmatia or the Dinaric region, which consists of a succession of folded mountains, unfortunately running parallel to the coast, so that they are extremely difficult

to cross. For many centuries there has been marked Italian influence along the coast, and the towns round the coast were, in many cases, built by the old Venetians. In the north Yugoslavia has built its new port of Suşak, just on the Italian border, next to Fiume. Farther down the coast there are the ports of Split, Dubrovnik (formerly Ragusa), and of the outlet of the former country of Montenegro, the port of Kotor (Cattaro).



FIG. 217.—The regions of Yugoslavia.

Much of the coast is very dry and its dryness is accentuated by the limestone mountains, but in the more fertile stretches Mediterranean fruits are grown, including the vine. Inland from the coastal regions one finds rugged and forested mountains occupied by the still wild country of Bosnia and Herzegovina; it is here that one meets the strong Mohammedan influence, and the principal town, Sarajevo, has a large number of Mohammedan inhabitants. This country adjoins the southern region.

(c) *The Southern Region*, which is large and varied, coincides with the former country of Serbia. The valleys are sheltered and famous for their fruit orchards, particularly of plums, which are dried and exported as prunes. The capital, Belgrade, lies on the northern edge of this mountainous valley region, actually on the river Danube.

(d) *The Northern Plain* is really a part of the Great Plain of Hungary, and it stretches from Belgrade northwards towards Zagreb. It shares with Hungary the large production of cereals of all types, particularly of wheat and maize.

In addition to its own outlets along the Adriatic coast which, as already stated, are difficult of access, Yugoslavia uses the Ægean port of Salonika, in Greece, and also has a considerable trade along the Danube with its northern neighbours.

**Rumania.**—Rumania was doubled in size as a result of the settlement after the Great War, and is now larger than the British Isles and has a population nearly half that of those islands. It is split into two parts by the broad belt of the southern Carpathian Mountains and the Transylvanian Alps. The mountains are forested and have the usual forest products and important sawmills. In the foothills of the south there are the very large oilfields of Rumania, so that the country ranks fourth among the countries of the world as a producer of oil. The oil is refined or sent by pipe-line to Constanta, on the Black Sea.

To the west of the mountains is the tangled mass of hills, largely forested, of Transylvania and the Banat; to a considerable extent inaccessible, there are important reserves of mineral deposits, gold, copper, silver, lead, iron and coal as yet little developed.

On the other side of the Carpathians, that is, along the Black Sea, we find the Wallachian Plain, which has, like the steppes of southern Russia, a continental climate with hot summers and cold winters, and a low rainfall coming mainly in the early summer. This is really part of the steppelands with which we have become familiar under Russia and it has a huge production of wheat, barley and maize. Here we find Bucarest, the capital, and the important river ports on the Danube of Galatz and Braila, and the Black Sea outlet of Constanta. This region supplies the surplus of agricultural produce available for export.

## CHAPTER XXII

### South America

**General Considerations.**—In certain respects the continent of South America offers a marked contrast to the other two southern continents. Whereas Australia is part of the British Empire and inhabited almost exclusively by persons of white origin, and Africa is inhabited in the main by negroes, and the whole continent, with two small exceptions, has been partitioned out amongst the empires of European peoples, South America consists of independent republics. The only exception to this statement is to be seen in the three small possessions of Britain, France and Holland, the Guianas in the north. Yet a little over a hundred years ago the whole of South America formed part of the great Spanish and Portuguese empires. We may thus in the first place treat the continent as a whole before we consider its constituent republican countries.

**Position and Size.**—The whole continent of South America has an area of roughly seven million square miles, *i.e.* over twice the size of Australia or the United States. The equator passes through the mouth of its greatest river, the Amazon, so that a considerable proportion of the continent lies in the Northern Hemisphere. Actually the southern tropic, the Tropic of Capricorn, bisects the distance between the northern coast and the southernmost point of Cape Horn, but the whole continent is wedge-shaped, tapering towards the south, so that more than two-thirds of the whole area lies within the tropics and roughly one-third outside the tropics. Thus we may say that all South American countries are tropical countries with the exception of Uruguay, the Argentine and most of Chile.

**Physical Features.**—The continent of South America can be divided into a small number of quite well defined physical units :

1. *The Western Mountain System*, or the Andean System,

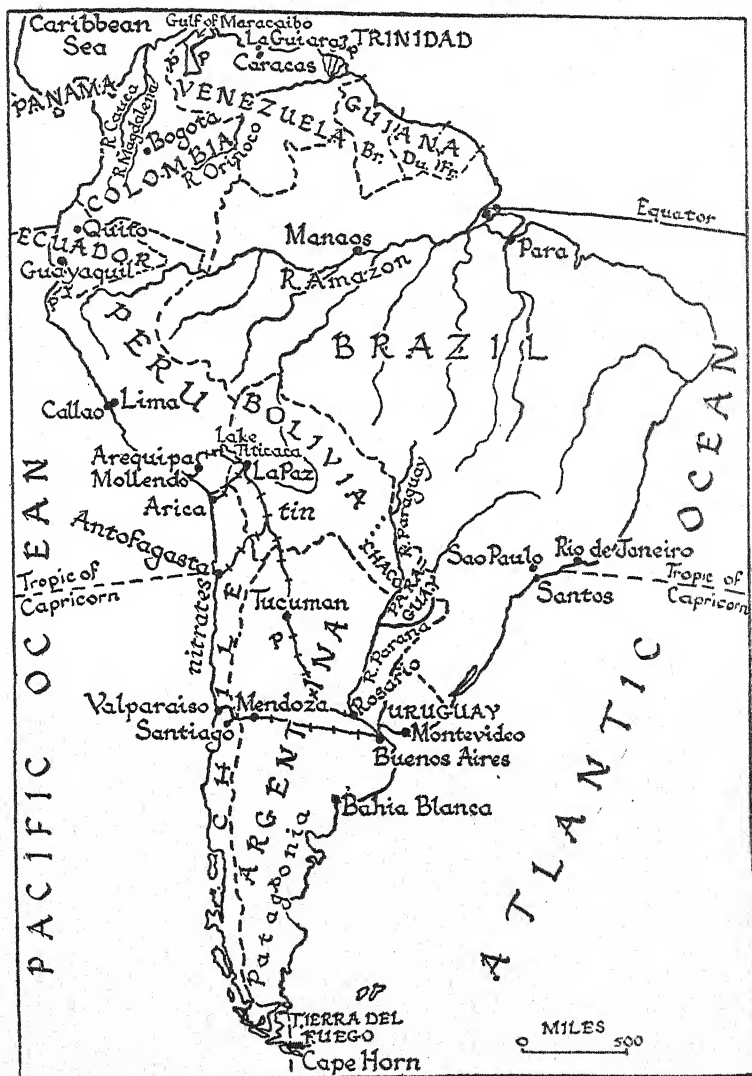


FIG. 218.—South America.



lies close to the western or Pacific coast. In the north there are four main ranges of mountains, and a subsidiary one to the west passing into the isthmus of Panama. Between the westernmost and the next range is the valley of the Cauca, between the next two ranges is the important valley of the Magdalena, whilst between the next two there is the great shallow gulf of the sea, known as the Gulf of Maracaibo. Passing southwards, these four mountain chains join up in a mountain knot, and then pass southwards as the main Andean chain. Farther south this divides, and between the two main chains is the broad high plateau on which lie part of Peru and the greater part of the republic of Bolivia, the famous region of the high plains or the "Altiplano," averaging 10,000–12,000 feet above sea-level. Farther south again the plateau between the eastern and western bounding ranges becomes narrower; later the mountains join up into a continuous chain again which passes southwards to the southernmost tip of the continent in the neighbourhood of Cape Horn. Between the main ranges and the coast, there is not infrequently a longitudinal valley and then a coast range, but these are not always present; and in the north the Andes themselves, or the foothills thereof, rise almost directly from the Pacific Ocean.

2. *The Central Plains* may be divided into five. There is the basin of the Orinoco in the north and then, secondly, the largest portion of the plain, the enormous and very flat basin of the Amazon and its great tributaries; and farther south the very important plains of the basin of the Parana and the Paraguay. This merges southwards into the rolling plains of the Argentinian pampas and then into the Patagonian Plateau.

3. *The Eastern Highlands* comprise two great blocks, the Guiana Highlands to the north of the Amazon and the enormous mass of the Brazilian Highlands to the south of the Amazon.

It is noteworthy that the main physical and climatic divide of the continent is the main crest of the Andes, so that the longer rivers, the Orinoco, the Amazon, the Parana and the Paraguay, flow towards the east, that is, towards the Atlantic Ocean.

**Structure and Minerals.**—The structure of the continent is very closely related to these physical features. The whole Andean chain resembles the other great mountain chains of the world in that it is a great mass of folded mountains, which arose

at the same time as the Alps of Europe, the Himalayas of Asia and the Rockies of North America. It is a typical Alpine, or Tertiary, folded mountain chain. In between the folded mountains are blocks of ancient rock, which, as one might expect, may be rich in metallic minerals. The chains themselves are largely volcanic in character; there are still numerous volcanoes but recently extinct, which tower above the high plains and lower mountain ranges. On the flanks of the folded mountains, just as in North America, there are gentler folds, and with these are associated the South American oilfields.

Thus those countries which share in the great Andean chain are often rich in metallic minerals obtained from the older rocks and at the same time have important oilfields associated with the flanks of the mountains. The rocks making up the great plains of the central part of South America are, on the other hand, of young rocks and do not contain minerals.

Where climatic and other conditions are suitable they afford good soils and fine agricultural land. The great plateau of Brazil is built up of a great mass of ancient metamorphic rocks and may vie with the Canadian Shield as being the largest (it is as yet not fully explored) area of mineral-bearing country in the world. The output of minerals at present is slight, though such things as iron ore are known to occur and

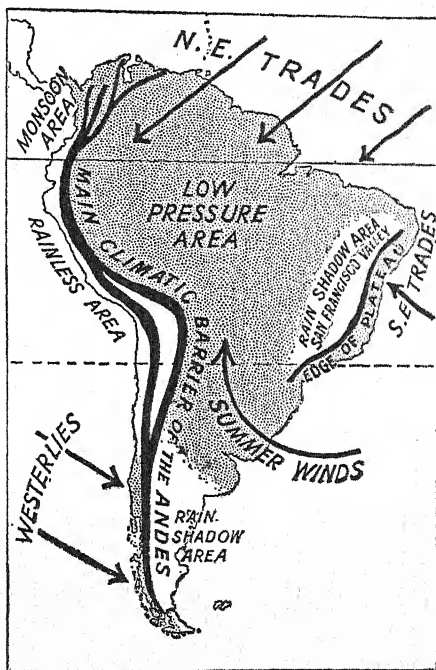


FIG. 219.—Physical sketch-map of South America and factors influencing climate.

small quantities of gold and diamonds are obtained. A very important part of this plateau is the southern part, where there is a large spread of fertile volcanic soil associated with the coffee-growing country in the hinterland of Santos and Rio de Janeiro.

**Climate.**—The greater part of South America lies within the tropics; it is only the Argentine Republic, Uruguay, and the southern two-thirds of Chile which lie outside the tropics in the southern temperate zone. As a result of the interaction of physiography and climate and their effect on vegetation, the whole continent may be divided on the basis of climate and vegetation into the regions shown in Fig. 220. We may distinguish:

#### 1. THE CLIMATIC AND VEGETATION REGIONS OF THE PACIFIC COASTAL STRIP

(a) The *monsoon region* in the north-west with a good summer rainfall, where dense evergreen forests flourish and where, in cultivated tracts, such crops as cocoa and sugar-cane are possible.

(b) The *desert region* in the centre, over much of which it is a real desert with no rainfall and practically no vegetation. Great areas of this dry region are important because of their yield of nitrates, valued in the agricultural countries of Europe and of North America as a fertiliser. Sodium nitrate is a very soluble salt and were there any rainfall it would all have been washed away. This mineral occurs in considerable beds near the surface, and the towns which have arisen in this desert belt are mainly nitrate towns or nitrate ports. The competition of artificial manures produced in the manufacturing countries of Europe has greatly affected the market for the natural Chilean nitrates.

(c) The *Mediterranean region* is a narrow strip, not extensive from north to south, in the neighbourhood of Valparaiso and Santiago, which enjoys a Mediterranean climate with hot summers and cool, wet winters, and in consequence has the usual Mediterranean vegetation and is an area favouring the settlement of man and the production of Mediterranean fruits and wine.

(d) *The cool temperate region.*—The southern strip enjoys well-distributed rainfall, which unfortunately is too heavy for the area to be extensively developed. It is also a mountainous tract, and thus in contrast to the other regions of the world having the same type of climate, remains largely undeveloped.

## 2. THE ANDEAN CHAIN

(a) *The Northern Andes.*—This portion of the Andes consists of the parallel chains already mentioned, separated by the fertile valleys of the Cauca and the Magdalena. The valleys themselves are tropical and tropical produce is available from them; higher up the slopes there are such sub-tropical crops as coffee, whilst sometimes on the ridges there is a temperate or semi-tropical agriculture and animal husbandry.

(b) The broad *Central Andes* is a plateau noted chiefly for mining while the cultivation of crops is limited, and where the ground-level is above that where trees can grow, and where, however, there are considerable tracts of poor grazing.

(c) The narrow *Southern Andes* act mainly as a divide between east and west.

## 3. THE CENTRAL PLAINS

(a) The *Basin of the Orinoco* enjoys a tropical climate and is covered therefore with grassland or with savana, but, like other tropical grasslands of the world, is as yet comparatively undeveloped.

(b) The *Great Amazon Basin* is the largest region of equatorial forest in the world. Much of it is low-lying and considerable areas of it are subjected to floods, with the result that the area remains undeveloped and nature holds full sway, the only roads penetrating into the dense equatorial forest are through the waterways afforded by the great river and its tributaries. It is eloquent of the size of the Amazon that 10,000-ton ocean liners can penetrate a thousand miles up the river as far as the town of Manaus. This was the home of the original wild rubber tree and there was in the past considerable exploitation of rubber, but the trees were practically exterminated by being cut down to get the produce instead of being tapped, and now the production of wild rubber from the Brazilian Amazonian forests is very small.

(c) The *Basin of the Parana-Paraguay and the Pampas* is on the whole a temperate region merging northwards into the warm temperate forests of the Chaco. The southern part is the land of the luscious grasses of the Argentine, which as in other temperate grasslands of the world have now been replaced to a considerable degree by crops.

(d) The *Patagonian Desert* is a dry, cool, temperate region occupying the Patagonian plateau. Part of the region supports a few sheep, but the most is uninhabited.

#### 4. THE EASTERN HIGHLANDS

(a) The *Highlands of Guiana and Venezuela* have a tropical climate, partly covered with forests in the wetter parts, partly by savana with scattered trees.

(b) *The Brazilian Highlands*.—This vast area is for the most part a region with a tropical climate; the amount of rainfall varies and consequently there is a change from the dense equatorial forest of the valleys and lowlands to the sparse forest and sometimes a scrub forest on the plateau itself. The southern part of the region enjoys what is virtually a warm, temperate climate and enjoys also very excellent soils of volcanic origin, and so has become the great settled area of Brazil with its production of coffee.

**Population and Recent Development.**—At the time of the discoveries of Columbus in 1492, the whole continent of South America was but sparsely populated by backward native tribes. Exception must be made to this statement for the highly civilised Incas whose great empire was on the western side of the continent. Within fifty years of Columbus's discovery much of South America had been covered by Spanish and Portuguese explorers, adventurers, missionaries and traders. Their activities during this period were simply amazing and most of the South American continent came under their jurisdiction. Quarrels between the Portuguese and the Spaniards met with the intervention of the Pope, who granted the east of 60° W., that is, Brazil, to Portugal, and Portuguese is there the language to this day, the remainder of the continent to the Spaniards, so that practically this whole area uses the Spanish language and has a culture which is basically Spanish. In the

early years of last century came the breaking away of one country after another from Spain and Portugal, so that the

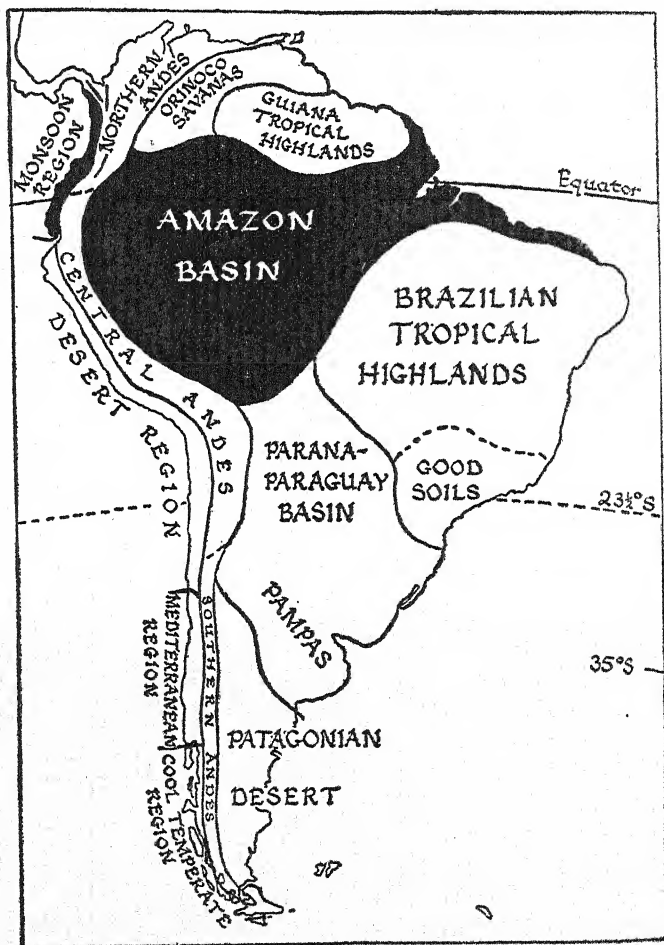


FIG. 220.—Climatic-physical regions of South America.

whole of South America is now occupied by independent republics if we except the three small tracts of territory, the

Guianas, which come respectively under British, French and Dutch rule. Each South American country is a republic; each, with the exception of Brazil, is Spanish speaking. In the tropical portions the larger proportion of the population is usually native South American which has intermarried with the Spanish "*conquistadores*." Along the margins of the Caribbean Sea, that is along the old Spanish Main, there is a considerable intermixture of negro blood from the negro slaves who were introduced from the West Indies.

The temperate lands of Argentina and Chile in the south have encouraged European immigration, so that there is now a great admixture of population and modern virile nations have grown up closely resembling the people of the United States of North America in their progressive outlook and their rapidity of development. Within the last century much of the development of South America has been the result of the steady use of British capital; large amounts of money having been expended in Brazil, the Argentine and Chile as well as elsewhere. A railway network made possible the opening up and development of the Argentinian pampas. Roads are now following rapidly. An interesting development of the last five years is of aerial transport; South America is now actually served by regular aeroplane services organised by an American combine, the Pan-American-Grace Airways. Towns which formerly took days and possibly weeks to reach are now in intercommunication within a few hours at the most. In making a brief survey of the countries of South America it should be noted how, in very many places, one great product is associated with each particular country, but that the old rule implied by this has been upset within recent years by the remarkably rapid exploitation of the oil reserves.

Venezuela consists of a tract of coastland, succeeded almost immediately by high mountains along the Caribbean Sea. Here is the chief port, La Guaira, and, reached by a mountain railway and road, a dozen miles away is the considerable and modern capital of Caracas. To the south lie the largely uninhabited and undeveloped grassy plains of the Orinoco, and there are stretches of forest on the Brazilian border. But the wealth of Venezuela no longer lies with the cocoa and the coffee of the northern hill slopes, nor even with the extending cultivation of

bananas, but with the great wealth of the oilfields particularly around the Gulf of Maracaibo.

**Colombia** occupies a unique position. Essentially a tropical country, it has a coast-line both along the Caribbean Sea leading to the Atlantic, and along the Pacific. It consists essentially of three great spurs of the Andes running from north to south and of the intervening valleys. The coastlands and valleys are hot, tropical lands yielding bananas and to some small extent cocoa. A more important product is the coffee of the higher slopes for which the country is famous. It should be noted that the more important towns are at a considerable elevation, including the capital, Bogota, on a high plateau away from the lowlands. Communications in the country are difficult. They are along the river valleys of the Cauca and the Magdalena assisted by railways, but recently Bogota has been made readily accessible by plane. The destiny of Colombia has been considerably changed of recent years, and now oil figures as the largest product and the chief export. It is exploited, as in Venezuela, mainly by British and American companies.

**Ecuador**, a smaller country farther south, lies immediately across the equator. It has a coastal strip producing in its hot climate cocoa, but the bulk of the country lies on the high plateau of the Andes. The principal port in a good sheltered position is Guayaquil, now also an air-port. The capital, Quito, at a height of 9,000 feet, has a climate described as that of perpetual spring owing to its elevation, though it is actually almost on the equator. Ecuador also has a growing production of oil.

**Peru**, the larger and more important country to the south, has a narrow, barren, largely desert, coastal strip rendered important at intervals by irrigation and producing on irrigated stretches Peruvian cotton and sugar. The chief port is Callao, about a dozen miles away from Lima, the progressive and modern capital. Lima itself lies in the shadow of the outer ramparts of the Andes Mountains. High up amongst the mountains of Peru are many mining camps with a considerable production of minerals. Along the northern part of the coastal strip Peru also is an important producer of oil. Towards the south of the country the port of Mollendo, an open roadstead



only, has great difficulty with the landing of goods, but is the head of a railway leading first to Arequipa and then climbing to a height of nearly 15,000 feet to the great Andean plateau where on the south side of Lake Titicaca lies the country of Bolivia.

**Bolivia** is an inland state with no port nor coast-line. The most important part of the country is that which lies on the high part of the plateau at an elevation of 12,000–15,000 feet above sea-level. This is above the tree-level and cultivation is limited. The native population, constituting three-quarters of the whole, is to a large extent a rather poverty-stricken one—a result of the difficulties of life at such high altitudes. The wealth of the country comes from its minerals; in the first place is tin, followed by copper and silver, and Bolivia produces something like a quarter of the world's tin largely from one extensive mine. From La Paz, the capital, there is a direct railway to the port of Arica. There is another outlet to the south of the country through the Chilean port of Antofagasta, whilst a three-days' railway journey is possible from La Paz to Buenos Aires. Bolivia also includes a large tract of territory beyond the Andes in the Chaco, unimportant until recently when the discovery of mineral oil was one of the causes of the dispute between Paraguay and Bolivia as to the ownership of this country.

**Chile**, that curiously long, narrow country, 2,000 miles from north to south but only 100 to 150 miles wide at the most, is divided clearly by nature into three parts:

(a) *The northern desert* is famed for its yield of nitrates for fertiliser and on which the prosperity of the country formerly depended, but which has been so severely hit by the competition of artificial nitrates produced in other parts of the world. Here are found the mining towns without the capability in many cases of producing even their own water, and for which the foodstuffs and other necessities of life have to be brought from the more fertile parts. The chief port here is Antofagasta.

(b) *The heart of Chile*, the most prosperous and most fertile part, is the Mediterranean belt where we find Valparaiso, the chief port, and Santiago, inland, the capital. It is essentially a Mediterranean land with a production of wine and Mediter-

ranean fruits, maize and cattle, whilst quantities of wheat and other cereals are produced even in excess of requirements.

(c) *The southern forested country* in parts has been given over to dairy farming, but is largely uninhabited owing to the extremely heavy rainfall and the lack of flat land suitable for settlement. Towards the south there is a small coalfield, but elsewhere Chile in common with all South America is essentially devoid of coal. The southernmost part of Chile, Tierra del Fuego, which it shares with the Argentine, is good sheep-rearing country with a very dense sheep population.

**Argentina** is by far the most important of the South American countries. It is mainly in the temperate zone, with just over a million square miles of land and a population of something like 10 million. It has in its great capital of Buenos Aires, a city of over two million inhabitants and which may now be called from the magnificence of its buildings and the predominance of its skyscrapers, the New York of the south, the only town in the Southern Hemisphere to have an underground railway. Buenos Aires is a great port and the focus of the railways which stretch in all directions across the rolling Pampas. These former grasslands are devoted almost entirely to farming and have a huge production of wheat, oats in the damper parts, maize in the damper and warmer north. Sheep are reared in the rather drier areas, and enormous numbers of cattle in the richer parts. The cattle are fattened and slaughtered for the production of chilled beef. Another leading product of this area towards the warmer north is linseed. Rosario is a river port which serves as the outlet of the northern parts of the Pampas; Bahia Blanca is a southern outlet. Towards the Andes the climate is much drier, and here cultivation is limited to sunny oases such as Mendoza, now producing large quantities of fruit and wine, and Tucuman farther north, with a considerable production of sugar. The large country of Patagonia towards the south is very dry. Sheep and goats form the main source of wealth of the limited population of this area. In the north the Argentine shares a portion of the sub-tropical forest, the Chaco jungle. Cultivation and settlement are gradually being pushed into this region. Both in the north and the south there are oilfields, but they are limited in extent as far as is at present known. Thus the wealth of the Argentine is almost

entirely in the productions of her agriculture. With the outstanding lack of oil and minerals and also of water-power, the Argentinians are, however, of recent years attempting to develop manufactures; previously there was a great reciprocal trade between the manufactures of the British Isles and the agricultural produce of Argentina. Britain and the United States are keen rivals in the supply of manufactured goods. Argentina deserves to be watched as a great and prosperous nation.

Uruguay, across the mouth of the La Plata river, shares to some extent the prosperity of Argentina and its capital, Montevideo, is both a fine port and a fine city. It is situated in the damper part of the grasslands and Uruguay concentrates its

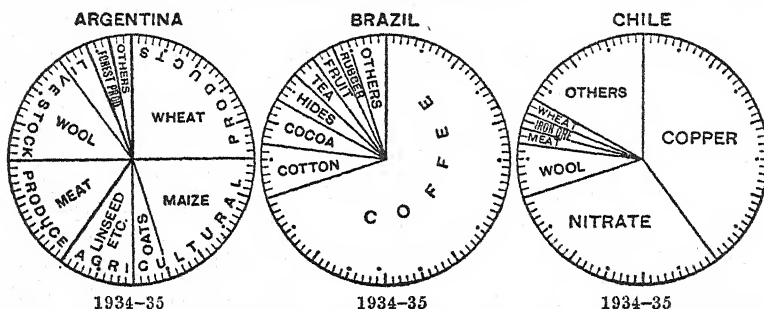


FIG. 221.—The exports of South American countries.

attention almost exclusively on cattle for the production of beef, together with large numbers of sheep both for meat and wool.

Paraguay, a small republic north of the Argentine, is reached by river. It is an undeveloped area with a small population with grassland for cattle and a considerable stretch of forest.

Brazil is the largest country in South America, rivalling in size the United States, and its proper name "the United States of Brazil" invites a further comparison. It would be difficult to find a greater contrast than is found between the various parts of Brazil—the uninhabited, unexplored, dense forests of the Amazon, and modern, sophisticated Rio, one of the finest cities of the world, gloriously situated on its enormous, mountain-

girt harbour. Three-quarters of all the exports of Brazil in value consist of coffee, produced in the great Coffee Belt lying rather to the west and north-west of Rio, particularly around "Coffeeapolis," namely São Paulo. Much of the coffee passes down the little mountain railway to the port of Santos. There has been an over-production of coffee in recent years, so Brazil is turning to fruits, notably to citrus fruits which are rapidly coming on the European market. Farther north along the coast there is cocoa and there is also a production of sugar in this area. The rubber of commerce came originally from the Amazon basin, and was obtained by the robber-economy of cutting down the trees, so that they are now scarce and practically all the present world production is from plantations in the Asiatic equatorial belts.

## CHAPTER XXIII

### Mexico and Central America

**General Considerations.**—Mexico and the six small republics of Central America, like the whole of South America, belong to Latin America; that is to say, they were colonised and developed by the Latin races, particularly by the Spaniards. They are all Spanish speaking, though they have all broken away, as have the countries of South America, from the yoke of Spain.

**Position.**—These countries occupy the narrow part of the North American continent bordered by the Pacific Ocean on the one hand and by the Gulf of Mexico or the Caribbean Sea on the other. The Tropic of Cancer passes through Mexico, so the greater part of that republic is tropical and the other six are essentially tropical. The tropical conditions are, however, moderated by the existence of high land.

**Physical Features.**—The broad backbone of North America, the Rocky Mountain system, passes southwards as a broad plateau through Mexico, bordered only by narrow coastal strips, but narrows southwards so as to pass through the Central American republics as a narrow mountain chain, reaching its lowest in the isthmus of Panama, though it is even there sufficiently high to cause considerable difficulty when the Panama Canal project was put in hand.

**Structure and Minerals.**—Just as in North America, the hard old rocks in the centre of the Rocky Mountain system are rich in minerals, and Mexico is the leading producer of silver in the world and has an important production of copper and other minerals. On the flanks of the Rocky Mountain system in Mexico, particularly bordering the Gulf of Mexico on the east, are significant oilfields which correspond in position with those of Texas farther north in the United States. A few years ago (in 1923) Mexico produced nearly a quarter of all the world's oil, ranking next to the United States, but of recent years the

production has dropped considerably and there does not seem much possibility of a further discovery of oilfields.

**Climate.**—The climate of Mexico and Central America is essentially a tropical climate. The rain-bearing winds are the north-east Trade Winds which naturally bring a heavy rainfall to the east coast, but a smaller rainfall to the mountains and plateaus, whilst on the Pacific side it is often so dry, as in the case of northern Mexico, as to be described as a desert. But when one gets farther south, in the isthmus portion of Central America,

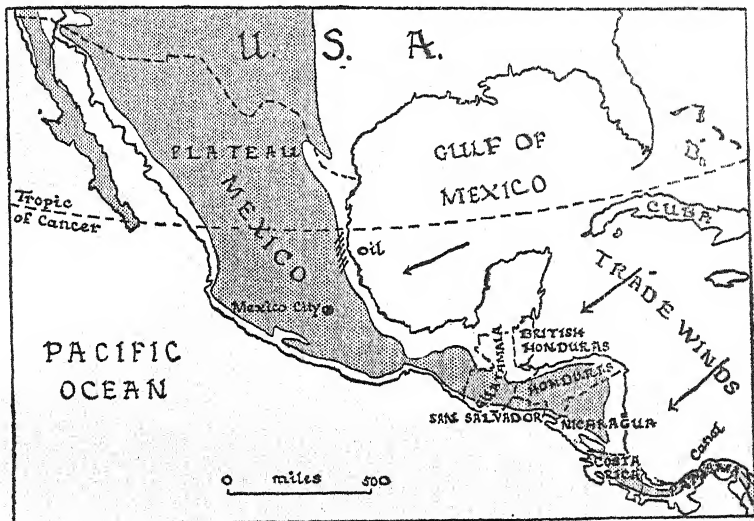


FIG. 222.—Mexico and Central America.

the land is too narrow for this state of affairs to occur and a good rainfall exists right across. The country of Panama is sufficiently near the equator to have almost an equatorial climate of constant heat and moisture.

**Vegetation and Agriculture.**—Owing to the existence of a central plateau we may in all cases distinguish three zones. Along the coast on either side it is hot and the climate can be described as tropical, though it may be wet, as on the eastern side, or dry, as on the western side. But given water it is

possible to cultivate tropical fruits, and of particular significance is the production of the banana. Then as one ascends the slopes the climate becomes cooler and one has what might be described as a warm temperate zone, where the cultivation of coffee amongst other crops is significant. Then on the surface of the plateau there is what is called in Mexico the cool zone, although the conditions can scarcely be described as cold. Here temperate cereals can be cultivated, provided sufficient moisture is available; the agriculture of the plateau belongs to temperate zones. Then there is the cold zone, which comprises actually the high mountains above 8,000 feet.

Mexico is a large country of over three-quarters of a million square miles and over 14 million people, most of whom are to be found

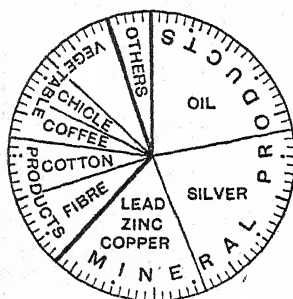


FIG. 223.—Exports of Mexico.

Note: chicle, obtained from the Yucatan Peninsula, is the basis of chewing-gum.

around the large and important Mexico City, on the surface of the plateau. Two-thirds of all the exports of Mexico are mining products—petroleum, silver, lead, zinc and copper amongst the principal. Many of the remainder are agricultural products, including both cotton and coffee and lately some bananas. The requirements of Mexico are naturally manufactured goods. It should be noted that 90 per cent. of all the exports go to the United States, and it is likely that the ties with that country will be increased in view of the construction of a roadway from the United States right through Mexico which is eventually to reach South America.

**The Central American Republics.**—North to south these are Guatemala and Honduras stretching right across from coast to coast, San Salvador on the Pacific side only, Nicaragua stretching right across, Costa Rica right across, and southernmost of all Panama. Costa Rica, though small, is economically one of the most important, with its production of fine coffee; but the east coast has recently become important owing to the trade in bananas. The significance of the republic of Panama

lies largely in its position. The United States Government with the consent of other powers of the world have leased from the Republic of Panama the strip of land known as the Canal Zone through which the Panama Canal has been constructed. The Frenchman, de Lesseps, who built the Suez Canal, tried after his success there to build the Panama Canal, but he failed and the project was shelved for a long time. His failure was due to the mountainous character of the country through which he had to take the canal, and even more to the tropical climatic conditions and the way in which fever decimated his workers. The work was taken in hand by the United States in 1903-4 and the Canal was finished in 1914. The Canal is 36 miles from coast to coast; there are three locks at either end and in the central portion the Canal runs through a great lake, artificially constructed to prevent the necessity of actually digging a large canal. Notice the strategic importance of the Canal to the United States in that it enables direct water communication between the Atlantic and Pacific coasts of that great Republic. The traffic between the eastern and western coasts of the United States, particularly in oil, forms a very large proportion of the traffic passing through the Canal.

**Cuba, Porto Rico and Haiti.**—The two largest islands of the West Indies are the homes of three independent republics. Cuba is in subordinate alliance with the United States, Haiti is occupied by two republics in which the influence of the United States is paramount, whilst Porto Rico has become a United States possession. Cuba is important for its enormous output of sugar and tobacco, largely going to the United States. The republic of Haiti and the republic of Dominica, with a total population of over three million, are both largely undeveloped. Haiti was formerly a French colony, Dominica formerly a Spanish colony; they share in the climatic conditions of the West Indies which have been previously described.



## CHAPTER XXIV

### The Near East

**General Considerations.**—If we study a political map of Asia, we are struck by the fact that where Asia meets or approaches Africa and South-Eastern Europe, we find a group of countries which are either independent or semi-independent. If we look at a physical map of Asia we are struck by some very interesting facts. The great mountainous heart of Asia and the mountain wall of India extend in a series of mountains and plateaus westwards from India through the countries of Afghanistan, Persia and Turkey to end against the Mediterranean and Aegean Seas. Thus we have these three countries, as it were, sitting on the wall which bounds the great Russian republic on the south. Afghanistan is in a very crucial position, lying between Russian Central Asia and India, and indeed only a very narrow tract of territory separates these two. South of this great line of mountains and plateaus we find the lowlands, dry country but watered by the Tigris and Euphrates, which now constitute the country of Iraq. Bordering the Mediterranean there is the French mandated territory of Syria and the British mandated territories of Palestine and Trans-Jordania. Then there is the huge area, on the whole a plateau sloping from south-west to north-east, which forms Arabia, a million square miles, to a considerable extent, it is true, desert, but nevertheless an area with oases and fertile tracts capable of supporting probably between 5 and 10 million Arabs. It is interesting that the Arabs call their own country the "Isle of the Arabs"; it is an island in the sense that it is bounded by the Red Sea on the west, the Indian Ocean on the south, the Persian Gulf on the east and by a great barrier of desert on the north. If we notice the position of this group of countries we shall find the Tropic of Cancer passing through the heart of Arabia, so that Arabia is really a continuation of the great deserts of the Sahara in North Africa. But the countries to

the north lie in Mediterranean latitudes; Palestine and Syria and the coastal fringes of Turkey are essentially Mediterranean countries. When we get to the mountainous heart of Turkey, Persia and Afghanistan we find that separation from the ocean

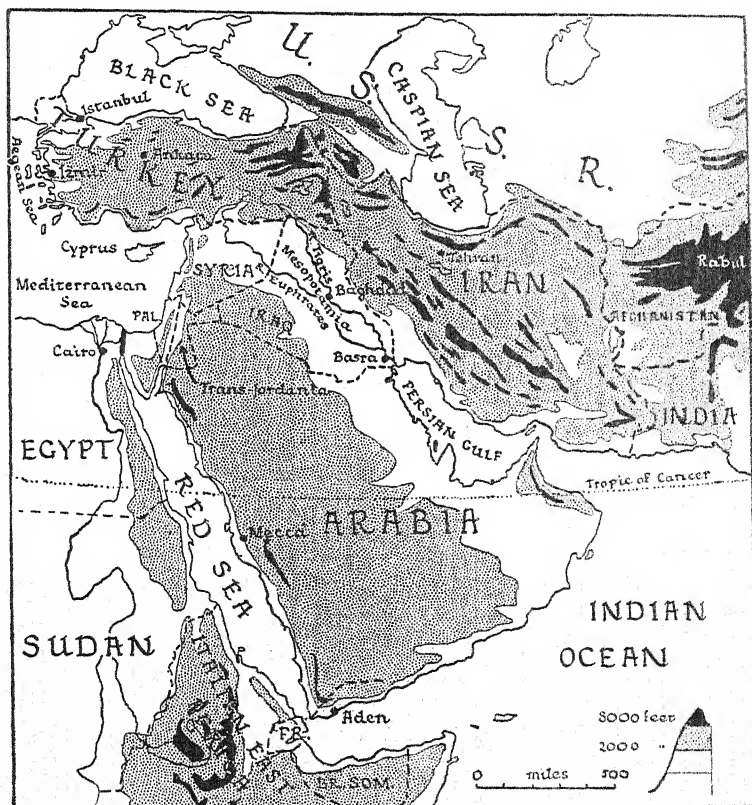


FIG. 224.—The Near East—political.

The mountain wall separating Russia from the Near Eastern countries and India should be noted.

modifies Mediterranean conditions; although there is still, however, winter rainfall they have a very small amount of moisture, with the result that large areas are desert or incapable of cultivation, and that owing to the elevated position of the

heart of these countries, they suffer from cold winters and strong winds and extremely hot summers. Similarly Iraq differs in being low-lying, but it has a small rainfall, otherwise it would be treated as a desert country rendered fertile only by irrigation.

Now let us look at the salient features of the economic geography of each of these countries.

**Turkey.**—The present-day Turkey is a compact, roughly rectangular block of country with an area of nearly a third of a million square miles and a population of about 15 million. The modern Turkey is essentially Turkish. The old Turkish Empire extended its influence over a very large portion of the globe and over still larger portions when one remembers that the old Sultan of Turkey was also the Caliph or the head of the Mohammedan religion. The modern Turks have divorced politics from religion and Mohammedanism is no longer even a state religion in the country. Under the Dictator, Mustapha Kemal Pasha, now called Mustapha Ataturk, Turkey is being developed as Turkey for the Turks. Only a tiny fragment remains of its former possessions in Europe.

The whole of Asiatic Turkey is thus a great plateau with margins along the Black Sea, the Ægean Sea and the Mediterranean Sea. The margins have a Mediterranean climate, Mediterranean agriculture and Mediterranean produce. The plateau, where it is sufficiently moist, can be used for the growing of temperate cereals, *e.g.* wheat, but large tracts are only poor grasslands inhabited by the Anatolian shepherd with his flocks of sheep and goats.

The new capital of Turkey, Ankara (really the old capital), has recently replaced Constantinople, or Istanbul, and is in the heart of this plateau. Of the places along the coast, Izmir, or Smyrna, is the most important.

Amongst the exports of Turkey the tobacco which is grown along the northern coast is especially important, and the dried fruits, particularly figs and sultanas of the Smyrna neighbourhood, come second in significance, while the goats of the plateau yield their quota of wool. The requirements of the country are manufactures and those things such as machinery and railway stock which are being utilised in the now rapid development of the country itself. Much of Turkey is rich in minerals and there may be a considerable output of minerals in the future.

In 1938 Turkey agreed with France for a joint control of the area around the port of Alexandretta (as the Republic of Hatay).

**Iran (or Persia)** occupies a great plateau bounded by mountains on the north and on the south, which lies between Russian Central Asia on the one hand and the Persian Gulf and Iraq on the other. Although it is a vast area, nearly two-thirds of a million square miles, the population does not greatly exceed 15 million. Large areas of the plateau are practically useless desert and the population is concentrated in those places which can be watered by irrigation from the snow-capped mountains or which are to be found amongst the more fertile valleys in the western part of the country or on the shores of the Caspian Sea.

In 1908 came the discovery of oil in the western part of Iran and the formation of the Anglo-Persian (now the Anglo-Iranian) Oil Company. The field has been developed along conservative lines, but even so, with a production of six million tons, Iran is fourth or fifth amongst the oil-producing countries of the world, and if one includes this amongst the exports petroleum represents two-thirds of all the exports of the country and something like a third of all the income of the government, in that the government gets royalties on the oil. Until recently there were no railways in Iran, but now a north-south railway connecting the Caspian Sea through the capital with the Persian Gulf is being constructed. Sections recently opened include that from Bandar Shah to Teheran. Motor roads are being extended in various parts of the country. Persian carpets are of course famous and these form the second export of the country.

Iran imports various manufactured goods and certain food-stuffs, but under the reign of the present Shah, the country is developing very rapidly; factories have been built for the production of cotton goods, large areas are used for the cultivation of beet from which sugar is produced in up-to-date factories, and tea plantations have now been laid out so as to render Iran independent of foreign imported tea. Previously tea and sugar were leading imports. Between a third and a half of all the foreign trade of Iran is with the British Empire, but second in importance and supplying large quantities of imports comes Russia; all other nations are far behind.

**Afghanistan.**—Although Afghanistan has an area about twice

the whole of the British Isles, its population is small. The real significance of the country is in its position. The country on the Indian border is inhabited by those still untamed tribes who are a considerable concern to the frontier guards of British India. The capital of the country, Kabul, is reached through the famous Khyber Pass from Peshawar in India, but it has recently become more easily accessible from Russia by the institution of a regular air-service from Russian territory.

Iraq is a direct contrast to these three countries which we have just considered, in that it is almost essentially a lowland country and corresponds roughly with the lower basin of the Tigris and Euphrates; indeed, the name Mesopotamia is the name particularly applied to the country between these two rivers, and Iraq actually consists of Mesopotamia with a section

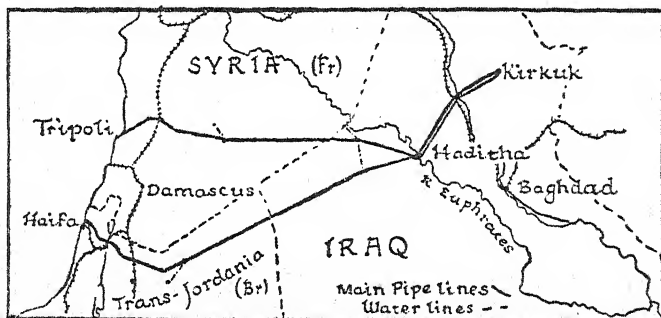


FIG. 225.—The Iraq pipe-line.

of country bordering the Persian Mountains on the east and a large section of desert on the west.

Lower Iraq is irrigated along the rivers and produces large quantities of rice, whilst date-palms line the watercourses in such a way that Iraq produces two-thirds of all the dates in the world.

Dates lead amongst the exports, but there is also a surplus of food grains shipped out of the country together with hides and skins. Naturally the demand of the country is for manufactured goods.

Great changes are likely to take place in the future with regard to the economic geography of Iraq, owing to the discovery in

Lower Iraq of large and rich oilfields. In 1935 a double pipe-line running right across the desert to the Mediterranean Sea was opened and the oil from the fields will be sent along these pipe-lines. One pipe-line ends at Haifa in Palestine, the other ends at Tripoli in Syria, so that both British and French mandated territories have a share in the important work of refining the oil, and it is likely that the riches which will accrue to the country as a result of the exploitation of this remarkable natural resource will aid greatly in economic development.

**Arabia.**—The surface of Arabia may be divided into (a) the true desert where man cannot live and where there are no habitations and where large tracts are virtually never crossed by human foot; (b) the dry steppes, or steppe deserts, where it is possible to find a little pasture for camels or for mules or possibly for horses; and (c) the large oases of cultivated land where live most of the people. These oases are either round the coast lands, particularly in the south-western corner of the country which is known as "coffee Arabia" or Arabia Felix and also scattered in the heart of the country. The popular conception of an oasis as a pool of water surrounded by a dozen date-palms does not apply to these large tracts where water is available and which may support between half a million and a million people. From time immemorial these large oases have acted as reservoirs of people. Trouble arises after bad seasons when the people are faced with starvation; they migrate in huge bodies and tend to overwhelm the people settled in surrounding countries. This happened in the days of ancient Egypt when the Shepherd Kings emerged out of Arabia and conquered the country.

## CHAPTER XXV

### China

**General Considerations.**—In 1912 one of the world's oldest empires, the Chinese Empire, became a republic. The old empire included the rich, thickly populated region of China proper together with Manchuria, as well as the huge but comparatively unimportant Outer Territories which lie in the heart of Asia and which include Chinese Turkistan, Tibet and Mongolia. The Republic which had its capital, from 1928 to 1937, at Nanking, replacing Peiping, or Peking, in the north, exercised influence over what may be called China proper. Manchuria, now declared an independent state, Manchukuo, under Japanese influence, has already been considered. Tibet is virtually independent and so is Mongolia, Mongolia coming largely under the influence of Russia. In 1937-38 the Japanese invaded China and gained control of much of the country.

China proper has an area of about a million and a half square miles, a population which is unknown but which is probably of the order of 400 million.

**Position and Size.**—China is about the same size as India and has at least the same number of people and probably more. Actually China is very much more densely populated because the amount of land which can be occupied is much smaller than is the case in India; the population density actually reaches as much as 3,000 to the square mile in some of the delta lands of China, not including the thousands of animals which live on the same square mile.

**Physical Features.**—China proper lies for the most part to the east of the great mountainous or plateau heart of the continent of Asia. In the north-west, part of the plateau of Mongolia, it is true, lies within the confines of China, and in the south-east there is the high plateau of Yunnan, but the remainder of China really consists of three great river basins. There is the Great Plain of China in the north which is actually

the plain of the lower course of the Hwang-ho, or Yellow River; Central China is formed of the great basin of the Yangtse River, whereas South China lies to a considerable extent in the basin of the Si-kiang. These fundamental geographical divisions correspond with the popular division of the country into North China, Central China and South China. Communication across the intervening mountain ridges is often difficult, and there was no railway between the Yangtse basin or Central China and

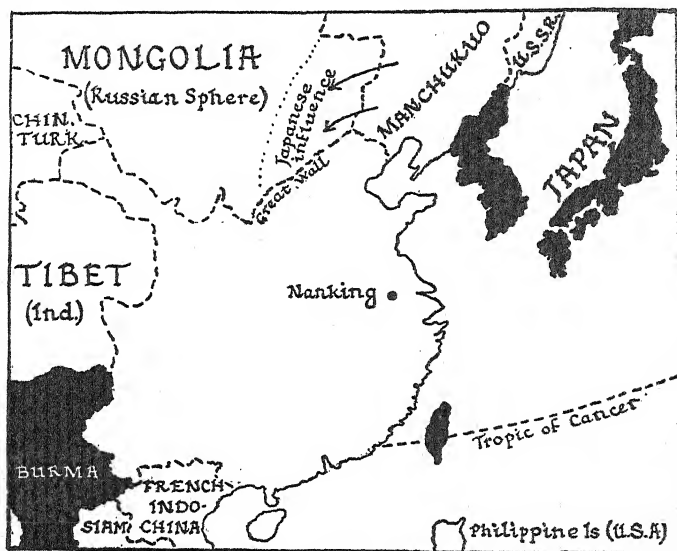


FIG. 226.—The boundaries of China.

Canton in the south until 1936. It is this difficulty of communication which is the great hindrance to the unification of modern China.

**Structure and Minerals.**—Most of the mountains and hills of China consist of ancient rocks which may therefore be mineral-bearing, but on the whole China is not rich in minerals. Most important is the extreme south-west where Yunnan is very rich in copper and near where tin and bismuth are mined. Amongst the hills of South China there are numbers of small coal basins, but they are not of great importance. Amongst



the ancient rocks, too, there are limited deposits of iron ore, but China is not, as far as is known at present, rich in iron. Underlying the Red Basin there is coal, probably one rather thin continuous seam which is not of great value from the point of view of modern requirements. It is in the north of China in the provinces of Shensi and Shansi that there occurs 80 or 85 per cent. of the total coal reserves of the country. Here there is an enormous coalfield which rivals in size that of Pennsylvania in North America. Although the reserves are believed to rank in quantity with those of possibly the whole of Europe, the exploitation of Chinese coal to-day is small, the output being about 40 million tons, two-thirds coming from modern mines, a third from old mines. China's great coalfield is near the Great Wall or northern boundary of the country and being close to the Japanese-controlled state of Manchukuo afforded an irresistible magnet for Japanese interests. There is a greatly mistaken conception as to the richness of China in minerals.

The Great Plain of Northern China, the central basins of the Yangtse-kiang and the delta of that river are great plains of alluvial deposits forming a rich, fertile soil, and it is in these areas that the majority of the people live.

**Climate.**—In winter China is very cold considering its latitude and it suffers from very strong, out-blowing winds which come from the cold interior of the Asiatic continent towards the sea. These winds are normally dry and in the north they give rise to serious dust storms; they blow down the Yangtse valley so that Shanghai is not infrequently under snow. In north China it is sufficiently cold for the rivers to be frozen. The Si-kiang valley and the south-east coast are protected to some extent from the cold out-blowing winds and so enjoy a milder climate, snow and frost being rare. In the neighbourhood of Shanghai and the Yangtse delta there is a limited amount of rainfall in the winter months.

In summer the conditions are reversed; the great part of Asia becomes extremely hot and there are in-blowing winds laden with moisture from the ocean. These monsoon winds, however, are not nearly as strong as they are in India, but for the whole country the summer is the rainy season. Temperatures over the whole are uniformly high and there is not much difference between the average for the north (78° F. or 79° F. at

Peiping) and for the south (Hongkong 82° F.) in the month of July. We see, therefore, that China falls into a number of climatic provinces. North China has very cold winters below freezing and strong dust-laden winds, hot wet summers but with a rainfall generally low, only about 40 inches. Central China has cold winters and hot wet summers, but has local winter rain. Southern China has a tropical monsoon climate not very different from that of India, though the winters are cooler.

**Natural Vegetation.**—The natural vegetation of China is forest, but it has been so largely removed that it is difficult to judge what the appearance of the country must have been. The forests have been completely cut away from the hills except where they have been sanctified as groves around a temple; thus the hills present a barren appearance suggestive of a rocky desert; only in a few parts in the south-east do forests remain on the hills. As one goes northwards and approaches the plateau of Mongolia, the natural vegetation changes to that of a grassland, but here the land is for the most part cultivated.

**Man in China.**—The heart of China is sometimes described as the Wei-ho valley, the Wei-ho being a tributary of the Hwang-ho in the north, and it is possibly here that Chinese civilisation was cradled. In any case the country has a long record of civilisation going back four or five thousand years. During the Middle Ages, and indeed almost to the end of the nineteenth century, the aloofness of China from the rest of the world was due to the self-contained nature of the country and the self-sufficiency of her civilisation. China indeed had no need of the produce or inventions of western countries; traders found it difficult to take anything to the country which would be acceptable, though they themselves were anxious to secure the silks for which the country was famous. Although more than one religion is practised in China their outstanding feature is their veneration for the family, including the departed. The desire is for sons, and the sons when they marry continue to live in their father's house and he remains the head of the united family until his death. The need for tending the graves of their ancestors has led to the immobility of the Chinese and inci-

dentally has led to the waste, according to western ideas, of large tracts of land for the purpose of cemeteries. It is only

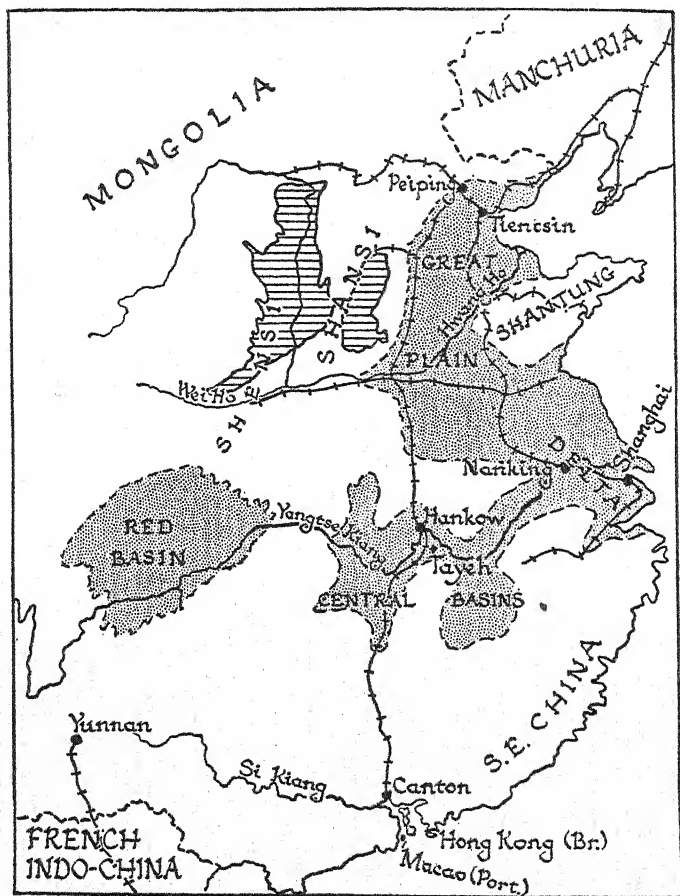


FIG. 227.—China.

The main areas of lowland, characterised by very heavy population, are stippled.  
The great coal basins of Shensi and Shansi are lined.

on the south-eastern coast and around Canton that the outlook of the people is different ; they are used to seafaring and are brave seamen, and it is the Chinese of this southern tract who

have emigrated and who populate so many of the countries of the Far East. With the overthrow of the Empire in 1912 the real change commenced. The younger generation is moving rapidly away from old customs: the pig-tail has disappeared, the Western church is already spreading from the Treaty ports inland, the lessening hold of their old religion is rendering the Chinese more mobile.

**Distribution of the Population.**—The population is concentrated in an amazing way on the tracts of lowland where cultivation is possible, for it is essentially an agricultural or rural population. When one refers to densities of a thousand, two or even three thousand to the square mile, one is referring to rural population, actually finding its sustenance on the ground on which it lives; thus the standard of living is extremely low amongst the masses—they live on the starvation level and the partial failure of crops results in famine, particularly in the north in the area of low rainfall, and immense numbers perish through famine, either through failure of crops or through flooding. The agriculture practised by the Chinese is a very intensive form of agriculture, and might really be described as market gardening; the utmost use is made of the land; nothing is wasted; human manure is regarded as extremely precious; in the past no labour has been too great—if a field has a heavy soil, an exchange is made with a farmer whose field has a light soil, and the soil from one is mixed with the other after being carried considerable distances in baskets.

**Occupations.**—The main business of 95 per cent. of the people in China is to grow sufficient food to live. Three-quarters of all the cultivated land in the country is occupied by the three chief food grains: rice in the south, where the yield is high, a mixture of rice and wheat in Central China, a complete absence of rice in northern China, where the food grains are wheat and millet, the latter tending to become the dominant grain where the rainfall is less than 40 inches a year. Other food crops include soya beans, in the south sugar, in the north maize, peas and beans. The tea for which China was once famous and which many years ago constituted its chief export, is grown particularly on the hills of the south and west. A limited quantity of cotton is grown in central China, particularly in

the Yangtse valley. A variety of vegetables is grown and mulberries on which are fed the numerous silkworms.

Amongst the animals pigs are extremely numerous, for fat pork is a favourite foodstuff; even this is out of the reach of the very poor. Throughout the country cattle are mainly draught animals, and are used in ploughing. In the drier north horses and mules are used particularly as pack animals, and there too are sheep, reared primarily for their coarse, inferior wool. Poultry are abundant everywhere and egg products form a leading item of export, even as far as Britain. China, of course, produces more silk than all the rest of the world put together, but does not export as much as Japan. The Chinese living near water—whether the sea or fresh water—are also fishermen.

**Manufactures.**—Native looms are found in most Chinese villages which have also their old-established craftsmen. An important feature of the development of modern China is the erection of cotton, wool and silk mills, but these are almost limited to such centres as Canton, Shanghai and other large towns. A considerable proportion of the mills in Shanghai are Japanese owned. There are iron works at Han-yang, near Hankow, using the famous Tayeh iron ore, but otherwise industries are in their infancy.

**Communications.**—It has been said that one can divide China into three zones so far as development and communications are concerned. There are first of all the Treaty ports, which are open to, and where one finds large numbers of foreigners. These have modern western-style buildings and the huge modern development that one associates with Shanghai, for example; here the modern development is very largely in what is called the International Settlement, a tract of territory ruled by a town council consisting of members from various nations. Canton, which might be described as the capital of South China, has developed in the same way, also Peiping, which might be described as the capital of North China. The modern capital of the country, Nanking, is centrally situated and tries to control the whole. The Yangtse being navigable even by large ocean-going vessels as far as Hankow, has given Hankow the opportunity to become a large inland centre, which is in the geographical heart of the country.

The second division of China is that part which is accessible from the railways and from the great navigable waterways, as well as from the small but growing number of modern roads. These areas receive western influence and western ideas.

Then there is the third division of China, the vast area which is out of reach of these modern methods of communication. In the north, on the narrow tracks pack animals are used; in the south human porters are often the only means of transport available; whilst in the north and part of the centre, land is too precious to be spared for roads, the tracks are just wide enough for the wheelbarrow of which the owner is also the steed and the conductor. But these things are rapidly changing and many of the provinces are rapidly pushing forward with their schemes of modern road construction. Wherever there is a road the motor bus comes. Many parts of China are now accessible by regular air services, and one can fly in a few hours to a town which formerly could only be reached by weeks of travel.

**The Foreign Trade of China.**—All the foreign trade of China takes place through the Treaty ports, and like that of India is nearly all sea-borne. The bulk of the traffic is through Shanghai, Canton, Tientsin and a few ports along the south-east coast. From the south a large part of the trade used to pass through Hongkong, which with its million inhabitants was a safe home for wealthy Chinese merchants who rather feared the conditions in their own country. As conditions in China improve, Hongkong is losing and is likely to lose a good deal of its old significance. Many years ago tea was one of the leading exports of China, but the China type of tea can now be produced and is produced in India, and as a leading export its place has been taken by raw silk. It is indicative of the growing industrialisation of China that cotton yarn and cotton goods come almost second amongst the exports, together with some raw cotton, eggs, silk goods and certain miscellaneous raw materials and copper. A few years ago the requirements of the country were manufactures, cotton goods, machinery, etc., and such raw materials as oil. The position has changed; China now figures as a very considerable importer of foodstuffs, of rice, of wheat, as well as of petrol for her new motor-bus services and cotton for her mills. Even before the events of 1937-38 Japan had a very considerable influence over the foreign trade of China; this

is indicated by the fact that Japan figured as the first amongst her trading associates, followed by the British Empire, including Great Britain and Hongkong in particular, and then by the United States with its market for silk and to a less extent for

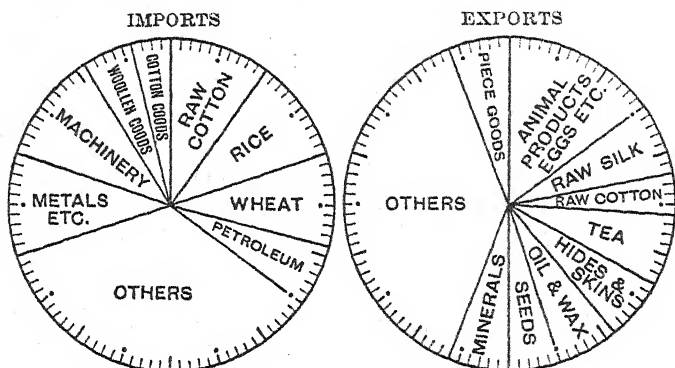


FIG. 228.—The foreign trade of China.

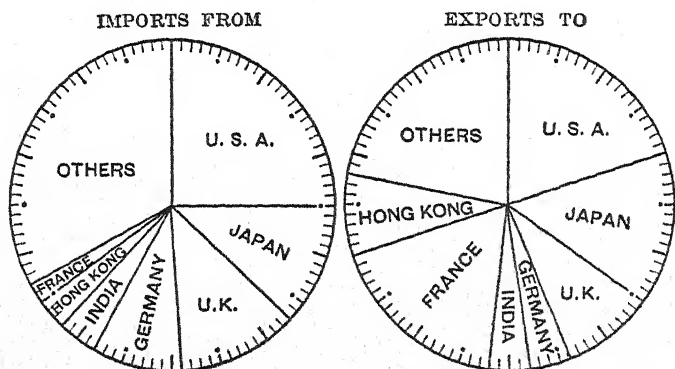


FIG. 229.—The direction of the foreign trade of China.

tea. There is no question that China will figure more largely in world trade within the near future. A nation of 400 million people, with a growing national consciousness, with leaders alive for the reform of such things as the currency and systems of communication, were beginning to experience the spread among

the people of a desire for a higher standard of living according to western ideas, and a larger demand for food. As a market, the possibilities of China are at present immeasurable. It was to the advantage of the nations of western Europe and of North America to realise that China must be encouraged to standardise her own affairs and to appreciate the higher standard of living which will increase her demands. But Japan saw this first and her military dictators took matters in their own hands.



## CHAPTER XXVI

### Some Minor Countries

As a result of the sequence followed in this book, a few minor countries have been passed over. The continent of Africa has not been considered as a whole at all, as it is almost completely parcelled out among the Great Powers. The independent kingdom of **Egypt** was, however, noted as falling under the British sphere of influence. The only independent country of Africa otherwise is now **Liberia**, a republic on the west coast founded for liberated slaves from America.

In Asia no reference has been made to that part of the Indo-Chinese peninsula which remains independent—**Siam**. Siam shares the monsoon climate of its neighbours, Burma and French Indo-China; the heart of the country is the valley of the Menam, or Chao Phaya, on which Bangkok stands and where much of the population is concentrated. Siam shares with its neighbours surplus production of rice which is exported and has an export of tin ore.

## CHAPTER XXVII

### Trade Routes

Since it is now clear that not one of the countries of the world, even the greatest, produces all that it requires, there is the necessity of bringing in those commodities which are lacking, and in return, of carrying away those commodities which are produced in excess. The major proportion of the international trade passes along the well-recognised trade routes which we will now consider.

**1. Ocean Trade Routes.**—More than 80 per cent. of ocean traffic is handled by liners operating along regular routes, leaving less than 20 per cent. to be handled by tramps, which have no fixed routes. The liners usually operate along well-known routes and are provided with coaling, oiling and refitting stations *en route*; routes are well surveyed and dangerous tracts marked by lighthouses and lightships; the special peculiarities of each section of the routes are well known. There is the further advantage of following a regular route that, should any mishap occur, there is a reasonable possibility of other vessels being within call. Off these well-marked and known tracks the oceans are almost deserted, even at the present day.

Other things being equal, the routes tend to follow the shortest distance between two given ports, that is to say, they follow along great circle routes. In the old days the sailing vessels were dependent upon winds and had to follow the regular wind belts, but these are now ignored and except for such difficulties as shallow water and icebergs, the minor obstacles formerly so important are almost forgotten. Fig. 230 shows the world's principal ocean routes. We can describe these briefly, in groups.

(a) *The North Atlantic Routes*, which lie mainly between the great ports of North America and those of Europe. In the United States are notably New York and Boston, with farther

south, Baltimore and the port of Newport News; in the north are the Canadian ports of Montreal and Quebec; on the European side the routes serve the great ports of the British Isles,

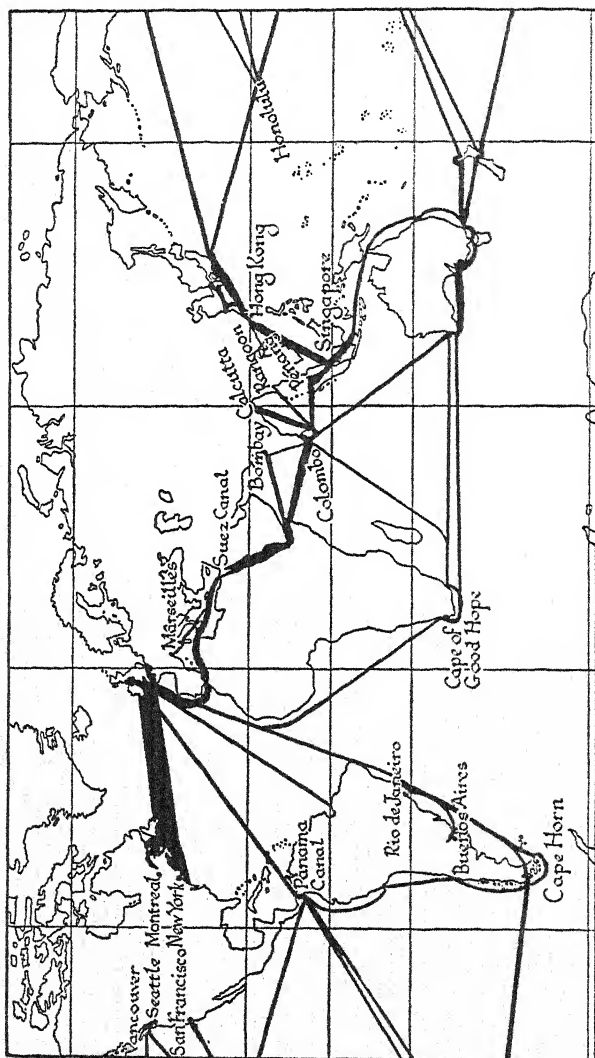


FIG. 230.—Ocean trade routes.

Liverpool, Southampton, London and Bristol, Cherbourg in France, Rotterdam in Holland, and Hamburg in Germany. In the winter, when the St. Lawrence is frozen, Halifax and St. John become the ports of Canada. This is by far the busiest of all the ocean routes and served by the largest liners, including the *Normandie*, an 80,000-ton boat, and the *Queen Mary* of the same size; but the majority of the ocean liners are between 10,000 and 25,000 tons. Here we should note the meaning of tonnage. Cargo tonnage refers normally to the actual weight of cargo carried expressed in long tons, 2,240 lbs., or short tons, 2,000 lbs. Actually, however, 40 cubic feet of cargo is normally reckoned as equivalent to 1 ton. The gross tonnage refers to space measurement, not to weight, 100 cubic feet being reckoned as 1 ton; gross tonnage is the capacity of the entire space between the frame of the vessel and the deck, together with any closed-in space above deck. Net or registered tonnage refers also to space measurements, but from the gross tonnage is deducted the space occupied by engines, gear, crew's quarters and officers' quarters; it represents, indeed, the space available for cargo and passengers. Displacement tonnage refers to the weight of water actually displaced by the vessel when fully loaded; it is really the weight of the vessel and its contents when fully laden.

There are other routes crossing the Atlantic, those from the North American ports already mentioned, through the Straits of Gibraltar to Marseilles and Italy, those from the North European ports to the Gulf of Mexico, including New Orleans, Galveston and the Mexican ports of Vera Cruz and Tampico.

(b) *The Panama and West Indian Routes*.—These routes cross the Atlantic Ocean obliquely, from Europe on the one hand, to Central America, the West Indies and Panama on the other. Passing through the Panama Canal they continue to Australia and New Zealand, or it may be, along the west coast of South America. It should be noticed that there is actually more traffic through the Panama Canal than through the Suez Canal, but the largest proportion of this is domestic traffic of the United States, particularly oil tankers passing between the western coast of California and the eastern coast of the States.

(c) *South Atlantic Routes*.—These again cross the Atlantic obliquely from Europe on the one hand to the Amazon Basin

on the other, or, more important, to the great ports of Rio, Buenos Aires and Montevideo. The traffic along these South Atlantic routes is naturally the export of manufactured goods from Europe on the one hand and the export of primary produce, mainly agricultural produce, from the South American countries on the other. There is a very large meat trade, and many of the ships on this route are equipped as refrigerator ships carrying meat in a chilled condition. In the same way a number of vessels on the West Indian route are especially equipped for the carriage of bananas, in chilled chambers.

(d) *The African and Cape Routes.*—Although German and other vessels ply along the west coast of Africa, the route is predominantly a British route. Some of the vessels round the Cape of Good Hope and return along the east coast and through the Suez Canal, others continue from South Africa across the south Indian Ocean to Australia and New Zealand. Compared with the shorter way through the Suez Canal to Australia, this takes a long time, but it avoids the heavy Suez Canal dues.

(e) *The Suez Route.*—The Suez Canal forms a converging point for a great variety of lines. From the west there are those from the North European ports of London, Rotterdam and Hamburg, etc., which pass through the Straits of Gibraltar and usually call at a number of Mediterranean ports such as Marseilles and Genoa before reaching Port Said at the entrance of the Suez Canal. Other routes start from southern France, from Marseilles, or from Italy, that is from Venice, Genoa or Trieste. All the routes pass through the Suez Canal itself and along the Red Sea, whence emerging into the Indian Ocean, some pass southwards along the east coast of Africa, but more pass across the Indian Ocean to the great junction of Colombo. From Colombo routes diverge to Calcutta, to Rangoon, to Penang, the Straits Settlements and the Far East and to Australia; whilst those routes which are concerned with Bombay and Karachi leave the Red Sea and do not call at Colombo.

The various nationalities using this route should be noticed, for ports of call are varied accordingly. Special interest in this route is maintained by the British, the French, the Dutch, to a less extent the Germans, the United States and Japan.

(f) *Pacific Routes.*—These routes run mainly between the countries of the Far East, China and Japan and the Philippine

Islands on the one hand, and the great ports of Canada, mainly Vancouver, or the great ports of the United States, particularly Seattle, San Francisco or Los Angeles, on the other. Some of these routes run direct along the great circle route which passes far to the north, near the Aleutian Islands, others call at Honolulu on the way.

There are also the Trans-Pacific routes from the North American ports to Fiji and New Zealand or from the Panama Canal in the same direction.

Certain recent changes in ocean transport should be noted. Sailing ships have practically disappeared and those constructed of wood almost entirely. Coal-burning steamships have largely been replaced by oil-burners, but the great tendency in the last few years has been to utilise the Diesel engine, operating on the heavy Diesel oil, but in general running in the same way as a motor car, an internal combustion engine in place of a steamship. Even when alternative means of transport are available, ocean transport remains important because of its comparative cheapness. It is thus particularly suitable for heavy or bulky produce, where the time factor is not the first consideration. Naturally ocean liners vary greatly in their speed, from 8 or 10 knots (8 or 10 nautical miles per hour) to as much as 25 or even 30, covering thus from 200 to 500 or 600 miles per day, with an average figure for the longer runs of 300.

**2. Air Routes.**—We may next consider the important recent developments of air routes. Aeroplanes are concerned with the transport of passengers and goods and tend to follow regular air routes for the same reason that liners follow regular ocean routes. There must be the necessary facilities for landing at the air ports, the routes must be well marked and the necessary ground control and equipment available. The provision of an air port is not the same expensive business as the preparation of a great ocean port, and in particular it may be noted that water-planes or amphibians are especially flexible in that any reasonably large extent of vacant water can serve as a landing ground; hence the use of such types of aircraft in exploring almost unknown territory. The great asset of the aeroplane is speed. Regular air liners have a cruising speed of about 150–200 miles an hour. Many places previously almost inaccessible or requiring days and weeks of travel to reach, have now

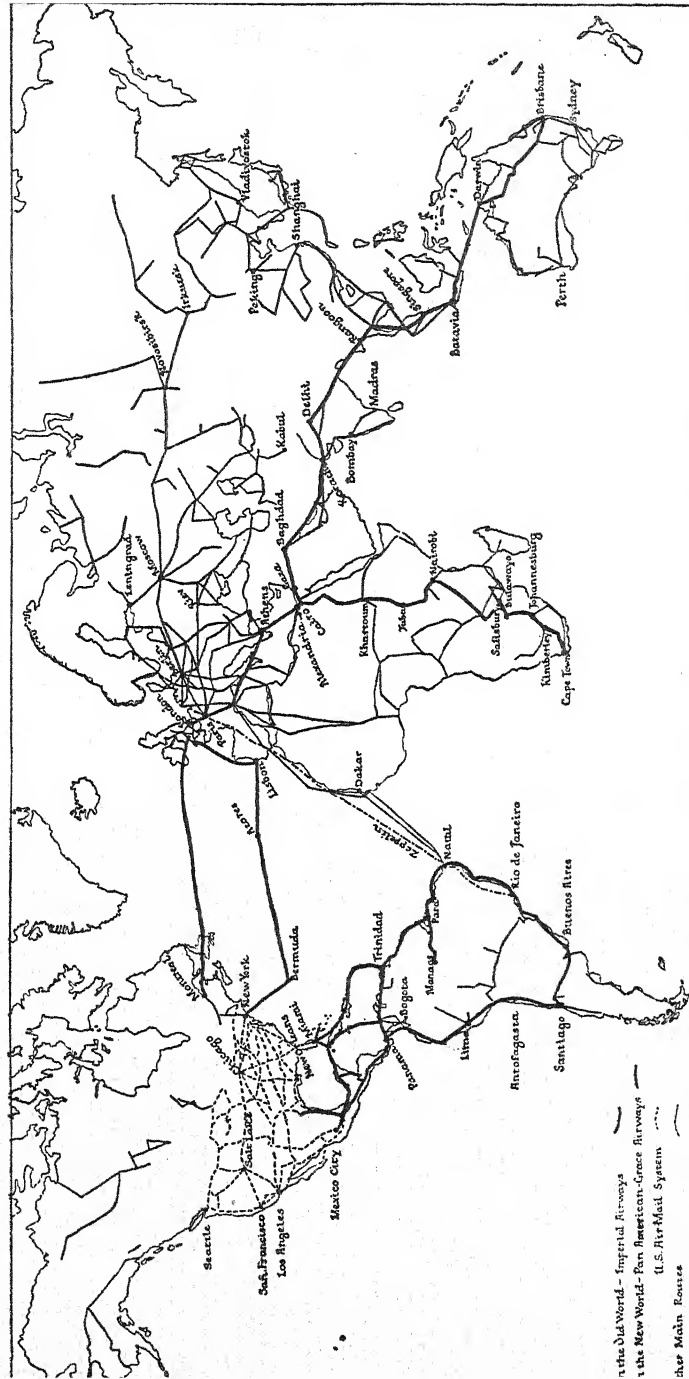


FIG. 231.—Air routes of the world.

Two projected routes across the Atlantic are shown. The Imperial Airways land routes shown on this map have now been replaced by flying-boat services Southampton to Alexandria, then Khartoum, and via the East African coast to Durban (see Fig. 158) or Alexandria, Lake Tiberias, Basra to Karachi and Singapore.

been thrown within a few hours of the great centres of the world ; thus Teheran, the capital of Persia, can be reached in two days from London against the older time of at least ten. A map has been drawn to show the principal air routes of the world, and it is to be noticed that these air routes are particularly important for passengers in a hurry and for mails ; a considerable proportion of the mail of the world is now carried by aeroplane. Lifting capacity, that is cargo and passengers, of the larger of the ordinary air liners on the routes shown is between 1 and 5 tons, but the weight of an aeroplane fully laden may be gauged by those used by Imperial Airways, between London and Paris, weight when loaded  $13\frac{1}{2}$  tons ; between India and Australia, weight when loaded 9 tons.

**3. Inland Routes.**—Apart from the airways, inland routes may be classified broadly into road, rail and water routes. Primitive forms of transport are still used in many parts of the world ; there are the human carriers of the heart of Africa, the camels of the desert, the elephants of the tropical forest, the pack animals, including the important mule and donkey of mountain regions, the bullock wagon of the heart of India, the dog sledges of the frozen north, the human-pushed wheelbarrow which still remains in the heart of China. But the modern, smooth-surfaced modern road is penetrating everywhere. Its modern importance is in large measure that of the motor and the internal combustion engine, whilst although long-distance transport, a hundred, two hundred or even three hundred miles or more is important on roads, it must be recognised that in most places the road transport of commodities is over short distances, and in this connection the roads are supplementary to, or act as feeders to, the railway. Despite the existence of the trans-continental highways in the United States, the main use of the roads is actually still in this way. For a car or a motor lorry, even though it be a half-ton, ton, two ton, ten ton or more, for commodities requires the active attention of the driver of the vehicle and it must remain his whole work, whereas a train crew of two or three can haul a load of several hundred tons. Whilst the railway has received in recent years severe competition from the road on the one hand, where short distances and easy handling from door to door are concerned, and from the aeroplane on the other where



extreme speeds are required as for mail, the railway remains an extremely important means of communication, with its average speed over long distances of 30-50 miles an hour; over limited distances and special runs considerably more. Reference should be made to the preceding sections for some of the more important trans-continental railways in the still partly undeveloped continents.

**4. Inland waterways, including canals, preceded the railways.** Although water transport is cheap, the rivers have the disadvantage that they are tortuous and this accentuates the slowness of the transport. Canals are expensive to construct, of considerable expense to maintain, and unless running through extremely flat country there is the delay of passing through innumerable locks. The relative importance of the canals in France and Germany when measured by those still in use in Britain is in large measure a question of the number of locks. Thus although it is true that a horse can easily drag a canal barge laden with 40 tons when 1 ton on a cart on a road would be a good load, the expenditure in time required for inland water transport has largely eliminated it in many areas. We should turn back to the appropriate section for most of the more important waterways of the world.

## Questions

These questions are taken from papers set in the last few years in the Institute of Bankers Commercial Geography, Part I, and similar professional examinations.

1. Choose a leading occupation in any part of the country with which you are familiar. Analyse carefully the natural or geographical factors (a) which have assisted its development and (b) which are favourable or unfavourable to its further development at the present day.

2. People in South America have recently been urged "to buy from them who buy from us." On this basis why should there be a good trade between Britain and South America?

3. Give a brief account of the foreign trade of the Irish Free State, showing how far the chief exports depend on the geographical conditions of the country.

4. Show how the distribution of the great softwood timber resources of the world affect the trade relations between Britain, Canada and Russia.

5. Draw sketch-maps to show any *two* of the following :—

(a) The London-India air-mail route.

(b) The main routes followed by wheat consigned from Canada to Britain.

(c) The areas of production of the chief exports of Australia or New Zealand.

6. Write a geographical account of the timber and pulpwood resources and industry of *either* Canada or north-eastern Europe.

7. Describe briefly the geography of *either* California or New England.

8. Compare and contrast *either* France and Italy or Switzerland and Czechoslovakia as regards resources, population and economic development.

9. Describe the geographical conditions found in the chief wheat-growing areas of *either* North America or Europe.

10. Give an account of the production of cotton and the cotton manufacturing industry in India, China and Japan.

11. Account for the chief characters of the trade of any *two* great ports of India, China and Japan.

12. Discuss the present and potential markets available for British textile manufactures in South Africa, or South America, or Australia.

13. What considerations, based on geographical knowledge, do you think should be behind the policy of British automobile manufacturers concentrating on export to any extra-European countries?

14. Discuss the situation of New Zealand in so far as it affects economic development and foreign trade.
15. Give an account of the mineral resources and the present production of minerals in Canada.
16. Outline the climatic conditions found in the Tropical Grasslands and elaborate for one of the main areas the probable or possible lines of economic development.
17. What geographical conditions favour the large-scale production of (a) raw silk, and (b) rubber? Mention the main areas of production and the markets they supply.
18. Compare and contrast the ports of Liverpool and Hull with special reference to their situation, hinterlands and trade.
19. "The coalfields of Britain are so situated as to favour in a remarkable way the development of a coal export and bunker trade." Examine this statement critically and compare the situation in Britain with that in *either* the United States *or* continental Europe.
20. From what sources does Britain obtain mineral oil? Mention any recent events which may affect the sources of supply.
21. Give an account of the geographical conditions necessary for the production of (a) tea, (b) cocoa, mentioning the chief exporting areas.
22. What do you understand by the Five Year Plan of Soviet Russia? Do the natural resources of the country justify the scheme?
23. Give a concise geographical account of any European country (excluding the British Isles and Russia).
24. Name the countries which supply raw cotton to the British Isles, and discuss the chief factors which encourage production in these areas.
25. Describe the main factors which have encouraged the rise of London to the position of the chief port of the British Isles.
26. State and explain the factors which encouraged the growth of three of the following towns: Newcastle-upon-Tyne, Paris, Danzig, Colombo, Buenos Aires, Montreal.
27. Divide the U.S.A. into agricultural regions. To what extent do they depend upon relief and climate?
28. Examine the resources of iron ore of the various countries of the world and the extent of the trade in this commodity.
29. In what respects do the relief and climate of India resemble those of Australia, north of the Tropic of Capricorn? What geographical factors may (a) encourage increase of population in the latter area until it becomes as dense as that of India, and (b) discourage it?
30. Describe and explain the mode of occurrence of mineral oil and discuss its world distribution.
31. Compare the difficulties of developing the coniferous forests with those of developing the equatorial forests.
32. To what extent is it true that the areas of dense population in the British Isles are concentrated upon the coalfields?

33. Give an account of the textile industries of the British Isles, with special reference to—

(a) Sources of raw material.

(b) Factors influencing the location of the various branches of the industry.

34. State the conditions under which any two of the following are produced, and give maps of the chief areas of production :—

Tea.

Coffee.

Cocoa.

35. Discuss the importance of irrigation in the development of any regions in the British Empire.

36. Describe, briefly, the relief of New Zealand (both islands), and show how this has affected the climate and economic development.

37. What are the geographical conditions best suited to the growth of cotton? Give an account of the cotton trade in each area mentioned.

38. Discuss the statement that "Tropical Africa presents many obstacles to commercial development."

39. "The exports of Canada go mainly to the British Isles and Europe, while the imports come largely from the U.S.A." Discuss critically.

40. The Tees estuary, the Clyde Valley and South Wales are regions with important iron industries. Select *two* of these regions and discuss the sources of iron ore and the resulting industries.

41. Describe the great shipping routes of the North Atlantic, and note any ways in which the routes are still influenced by wind and climatic factors.

42. Enumerate the principal coalfields of Europe. Choosing *one* of these, indicate the main industries that have developed on the coalfield. (A sketch-map is essential.)

43. What climatic and other factors are responsible for the localisation of (a) wheat farming, (b) dairying, (c) sheep rearing, (d) the raising of sugar-beet in Great Britain?

44. What are the main sources of exportable wealth in Brazil, Argentina and Chile? Account for the lead established and maintained by the Argentine in the matter of foreign trade. (Sketch-map desirable.)

45. Give an account of the climate of India. Show how variations in the climate determine the areas of production of the leading agricultural commodities.

46. What advantages does Canada possess over Australia in the future development of manufacturing industries on a large scale? Give details of existing manufactures in each area.

47. Discuss the importance of Calcutta, Buenos Aires, Liverpool, Singapore and New York, making special reference to the extent and productiveness of the hinterland of each port. (Sketch-maps are necessary.)

48. What features have led to the present importance in dairying of Denmark, the Irish Free State and New Zealand?

49. "The North German plain is an example of an area with characteristic natural resources of which the inhabitants have taken full advantage despite great natural obstacles." Discuss this.

50. State the position and account for the importance of five of the following towns :—

Capetown, Johannesburg, Sydney (Australia), Singapore, Glasgow, Marseilles, Hamburg, Middlesbrough.

51. Select one of the "special" or "depressed" areas of Great Britain and describe the natural or geographical features which helped the establishment or growth of the chief industries and which affect the present position.

52. Give an account of the natural resources and foreign trade relations of *one* of the following :—

Austria, Hungary, Egypt.

53. Discuss the rôle of *either* India *or* Japan in world trade.

54. Institute a comparison between the United States of America and the U.S.S.R. as regards extent and character of land, actual and potential agriculture production and use of land.

55. Describe with the aid of sketch-maps recent developments in the air communications of the Empire.

56. What do you consider to be the essential geographical factors underlying the successful development of water-power? Give suitable examples from particular countries.

57. Discuss in the light of physical and human conditions the possibilities for the future economic development of the Amazon Basin.

58. Describe and account for the significance of the Great Lakes in the transport system of North America.

59. Examine and explain the nature of the foreign trade of India.

60. Analyse broadly the nature of Chinese and Japanese interests respectively in Manchuria.

61. Describe and explain the distribution of population in *temperate* Australia.

62. Write a short essay on the economic geography of *one* of the following areas : (a) the Transvaal, (b) Egypt.

63. Give a brief *systematic* account of the economic geography, making special references to surplus products available for export, of *one* of the following :—

New Zealand, Irish Free State, Chile, Spain.

64. Give an account of the world production of *two* of the following commodities :—

Cocoa, rubber, wool, cotton, gold.

65. Describe the geographical factors which have favoured the growth and give an account of the trade of *one* of the major ports of Great Britain, France or Germany.

66. Give a concise geographical account of the coalfields of Great Britain, stressing the relative importance of each and any special local problems.

67. The North Atlantic trade route lies between Europe on the one hand and North America on the other. Enumerate the chief ports at the two ends of the route and give brief notes on the characteristics of each, including the traffic handled. What recent changes have taken place in the type of vessel serving the route?

68. Give an account of world production of *two* of the following :—  
Mineral oil, tea, coffee, oranges and bananas.

69. Show with the aid of a sketch-map the position of Abyssinia. By what countries is it bordered and what interests might each be expected to have in its progress and development?

70. Give a systematic account, stressing natural resources, of *either* France *or* Germany.

71. Write a brief essay on the population problems of India.

72. What important changes have taken place since pre-War years in transport and communications affecting the British Empire?

73. We in Britain purchase 60 per cent. of our essential food requirements from overseas. Distinguish between those commodities which we could and those which we could not produce at home and indicate the chief sources of supply.

74. Give an account of the manufacturing industries of the United States.

75. What changes in political frontier have recently taken place in the Far East? What countries now exist there and how are the changes affecting international trade?

76. Outline the development of industries along Tees-side.

77. Locate and account for the major area of crop production in Britain. Comment briefly upon the distribution of the several crops within the area.

78. Discuss the agriculture of East Anglia in relation to physical conditions and to transport considerations.

79. What is a *conurbation*? How far can the situation and extent of *any one* British conurbation be explained on geographical grounds?

80. Discuss the development of *any one* major industrial region of the British Isles, analysing carefully the factors which led to the establishment and present prosperity of the important industries within the area.

81. *Either* (a) Describe briefly the factors favourable or otherwise to the establishment of regular air services between Great Britain and Canada, discussing the possible routes;  
*or* (b) Estimate the importance of the Suez Canal as a route-way, indicating the commodities passing through the canal.  
(Use sketch-maps to illustrate your answer.)

82. Write a brief essay on the geographical factors affecting the relationships of China, Japan and Manchukuo. How far do they explain the relative strength of China and Japan?

83. Give an account of the natural resources and industrial development of *one* of the following :—  
Canada, Argentina, Italy.

84. What geographical and political factors influence the present and may determine the future distribution of population in Australia?

85. Give an account of the world production of, and trade in, petroleum (mineral oil), and gold, or of beef and dairy produce.

86. Give a short account of the importance and trade of *two* of the following ports:—

Liverpool, Hamburg, New York, Rio de Janeiro.

87. Explain and account for the conditions of trade between Great Britain, Canada and the United States.

88. From what parts of the British Empire are raw cotton, raw wool and cacao (cocoa) respectively obtained, and where in Great Britain are to be found manufacturing areas using each of these raw materials? Give reasons for location of production and manufacture.

89. State, as precisely as you can, the situation of Port Churchill, Aden and Durban; and point out the geographical circumstances affecting their trade.

90. Give a reasoned account of Northern Ireland, and point out the main geographical circumstances affecting Northern Irish agriculture, manufactures and trade.

91. "The great need of Australia is population." Discuss this statement having regard to (a) climate, (b) agriculture in the sub-tropical regions, (c) the labour problem in the tropical regions.

92. Give an account of the world production of two of the following commodities:—

Wheat, flax, cotton, silver, petroleum and related substances.

93. Relate the chief crops of Italy to the geographical conditions of the area.

94. Give a brief systematic account of the economic geography of one of the following:—

Belgium, France, Argentina.

95. Describe the geographical factors which have favoured the growth, and give an account of the trade of *two* of the major ports of—  
New Zealand, South Africa or Canada.

96. Discuss the rôle of the United States of America in world trade.

97. Give an account of the natural resources and foreign trade relations of one of the following:—

Chile, Sweden, Japan, The Anglo-Egyptian Sudan.

98. "Vegetable oils for food consumption are being used in increasing quantities." What regions of the world supply these, and what vegetable oils are used for this work?

99. The Great Lakes of Canada and the River St. Lawrence form an important commercial highway. Give an account of the trade of this route and refer to the canals which have been constructed to help this trade and the main ports handling it.

100. Write brief but complete notes on *four* of the following, giving their positions and importance, and nature of trade:—

(a) Singapore, (b) Cape Town, (c) Karachi, (d) Galveston, (e) Buffalo.

101. What are the main wheat-producing regions of the world? What factors control the successful growth of this crop? What are the main countries with a surplus for export and what are their markets?

102. Write a brief account of the distribution of coniferous forests in Europe. Choosing one important area, give details of associated industries, and show to what extent the location of such industries depends on the rivers of the area.

103. Discuss the importance of British South Africa in the matter of mineral production.

104. The main exports of Brazil, Chile and Argentina show contrasts largely dependent on climatic differences in the three areas. Elucidate this statement.

105. Write an account of any *three* manufactures of the British Isles, other than those directly concerned with wool, cotton, iron and steel. In each case mention the source of supply of raw material.

106. Describe the main routes established by Imperial Airways for linking up the component parts of the British Empire, together with a note on routes projected for the near future.

107. Describe, with the help of a sketch-map, the position of Calcutta, Singapore, Colombo, Bombay and Cape Town. Attempt to analyse the salient features connected with the trade of each port, bringing out any contrasting elements due to geographical position.

108. Give an account of the resources and occupations of the people of Austria or Switzerland or Czechoslovakia.

109. What are the chief centres of the iron and steel industry of England, and what geographical advantages does each of them possess?

110. Give an account of the South Wales coalfield, including the nature of its coal deposits and the trade and industries of its area which are based on coal.

111. What are the main economic resources of China? Why are the United States of America and Japan interested in their development?

112. The expansion of Australian agriculture depends on the control of all available water supplies. Explain why this is the case.

113. What conditions favour the production and export of wheat from Canada?

114. Explain the meaning of the term "natural region" and illustrate your answer with specific examples.

115. What is meant by the term "Mediterranean type of climate"? Where is it experienced and how does natural vegetation adapt itself to the climatic conditions?

116. Give an account of the production of wheat in Canada and of the routes by which it is exported.

117. What are the difficulties experienced in the development of Tropical Lowlands? What steps have been taken to overcome these in some cases?



118. Describe the route of the main line of railway from London to Edinburgh (L.N.E.R.). Point out the types of region served.

119. "A good harbour does not necessarily give rise to a great port, neither does a great port necessarily have a good harbour." Discuss this statement, drawing examples from Europe.

120. Write a geographical account of either Ceylon or Holland.

121. Set out carefully the factors which either help or hinder the trade of the United States of America with one from each of the pairs of countries or areas given below, and give concise accounts of the trade.

(a) Canada, North-West and Central Europe.

(b) Brazil, Eastern Europe.

122. Show how geographical conditions have hindered the development of Abyssinia and estimate the possibilities of the country under the control of a European Power.

123. Describe the course of the Nile and give an account of the part it plays in the economic life of Egypt and the Sudan.

124. For the three products given below, (i) state the conditions under which they are produced, and where, (ii) indicate briefly the world trade and the uses to which they are put.

(a) Maize, (b) Cocoa, (c) Coconuts.

125. Give a geographical account of the economic development of one of the following :—

(a) Denmark, (b) The Pampas.

126. Outline the geography of Japan so as to bring out the difficulties of the country with regard to farming and manufacturing and indicate the means by which the Japanese are attempting to overcome them.

127. Contrast the Indus and Ganges basins as fully as you can.

128. Give concise accounts of *two* of the following :—

(a) The mineral wealth of Australia.

(b) The sheep industry of New Zealand.

(c) The trade of Ceylon.

(d) Two routes connecting Johannesburg with the coast.

129. Compare and contrast the dairying industry in Denmark and New Zealand and account for their importance in British trade.

130. Into what natural regions may S. Africa be divided? Give a short account of the products of each region.

131. What conditions are necessary for the growth of a great port? Illustrate your answer by reference to—

New York, Liverpool, Antwerp, Marseilles, Genoa, Colombo.

132. Give an account of the economic geography of *one* of the following :—

N.W. France, The Ruhr Area, The Po Valley, The St. Lawrence Corridor.

133. Choose any one of the following industrialised areas and show how its geographical conditions have favoured its development :—

(a) The Lancashire cotton district.

(b) Tees-side and Tees-mouth.

(c) The Pennsylvanian bituminous coalfield.

134. Discuss the increasing industrial significance of Metropolitan England.

135. Sketch the correlation between the distribution of population and the salient geographical conditions in any one of the following :—  
Canada, Spain, India.

136. Choose any *two* of the following commodities : Maize, Petroleum, Cotton. State the main areas of large-scale production and the markets they supply. Bring out the position of the British Empire in regard to "supply and demand" in each of the two commodities discussed.

137. Present an orderly geographical account of any *one* of the following :—

Florida, Switzerland, Newfoundland, Chile.

138. Draw maps, with any necessary brief annotations, to illustrate any *two* of the following :—

(a) The areas of close settlement in *either* the Union of South Africa, *or* Australia.

(b) The main routes followed by wheat consigned from Canada to Britain.

(c) Airways and seaways serving British Empire lands around the Indian Ocean.

139. Indicate the importance of geographical factors in the growth of a great seaport by a consideration of any *three* of the following :—  
Trieste, Vancouver, Marseilles, Southampton, Singapore.

140. What are the leading countries in (a) coal reserves, (b) coal production and (c) coal export ? How do you account for the position that your statement reveals ?

141. Give a concise geographical account of the world production of, and world trade in, *two* of the following : raw silk, tin, wool, wood and wood products.

142. Choose *one* of the following subjects and write a short geographical essay on it :—

(a) The Trans-Alpine railways.

(b) The advantages and disadvantages of either Sweden, or Finland, in reference to economic development and foreign trade.

(c) The geographical background of the relative prosperity of the Argentine among South American countries.

143. Write a brief geographical description of *one* of the following :—  
Dutch East Indies, Mexico, Chile, Austria.

144. Discuss the economic geography of one of the major coalfields of England, emphasising the factors influencing the localisation of industry.

145. Discuss with reference to particular areas outside the British Isles the causes which influence the localization of :—

(a) the iron and steel industry.

*or*

(b) the wood and paper-pulp industry.

146. What available land, sea and air routes are there between England and Singapore ? Estimate their relative importance.

147. Write a detailed account of the economic development of *either* Brazil or the Argentine.

148. Compare and contrast the economic development of Norway and Sweden.

149. Describe and account for the economic activities of the Central "Valley" of Scotland.

150. Write an essay on the geographical aspects of *either* (a) British Fisheries or (b) British Agriculture.

151. Discuss the geographical factors which have contributed towards the importance of *four* of the following towns :—

Paris, Tokio, Calcutta, Singapore, Cairo, Hankow.

152. Give a concise account of the distribution of forests and minerals throughout Canada.

153. What are the conditions favourable to the growth of a great port? Discuss the advantages and disadvantages of Glasgow, Marseilles and Hamburg as ports.

154. "The populations of Australia and New Zealand are bound to remain small." Comment on this statement.

155. Divide India into major natural regions. Comment on the climate and chief crops of one of the regions.

156. The main trade routes of the world at the present time run East and West, whereas, according to the regional division of the world they should run North and South. Explain this apparent anomaly and suggest, giving your reasons, where you consider the trade routes of the future will run.

157. Write a geographical account of one of the following :—

- (a) "Manufacturing industries of Canada."
- (b) "Cotton production in the United States."
- (c) "World production of rubber."

158. Give a geographical account of two of the following :—

Chile, Brazil, California, Queensland.

159. Discuss the present and potential world production of

- (a) iron ore.
- (b) wheat.

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